Biotrial Inc.'s Facilities at 130 Norfolk St., Newark, NJ
Water Issues – History, Research & Testing

December 18th, 2014 – excavation and tie in domestic and fire service piping - Barnard Construction

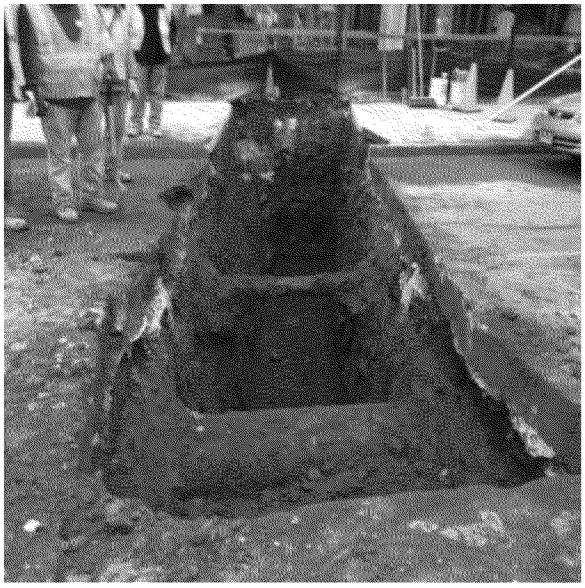
December 19th, 2014 – complete fire protection piping, backfill and pave trenches - Barnard Construction

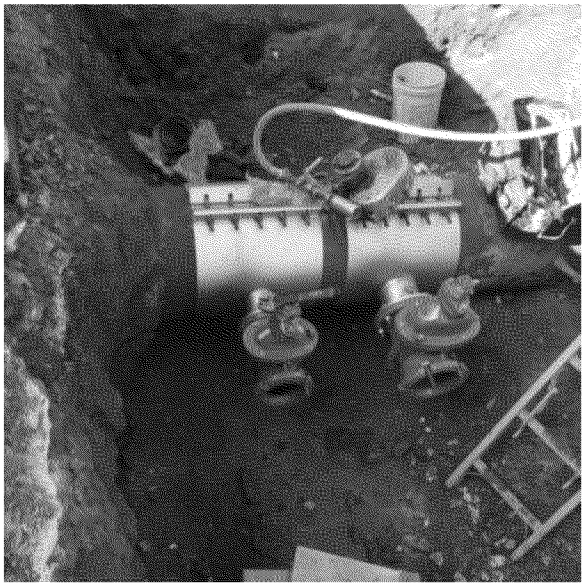
December 17th-22nd, 2014 – Rock Solid Construction performed water kills to existing underground services.

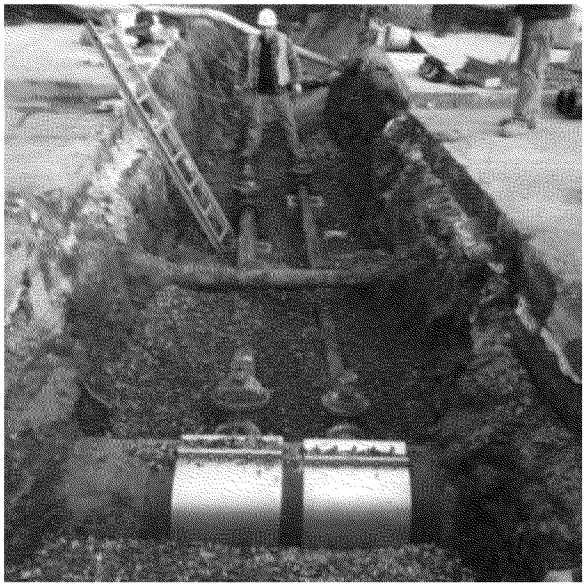
April 10th, 2015 – Barnard performed full flush of system prior to tie in to systems – video available

June 23rd, 2015 - Water main on Norfolk St. tapped for domestic & fire protection tie-in, performed by Barnard Construction.

- Water line from the main to the building is cement lined DIP
- The pipe was backfilled using ¾" clean stone and DGA
- Wet tap pressure tested tapping sleeve/valve , DIP to the building tested







July 20th, 2015 – Domestic water test from basement taken by Jersey Mechanical and analyzed by Garden State Laboratories, Inc.

Garden State Laboratories, Inc.

Bacteriological and Chemical Testing

410 Hillside Avenue
Hillside, New Jersey 07205

Toll Free 800-273-8901
Telephone 908-688-8900
Fax 908-688-8966
email: info@gslabs.com
Internet: www.gslabs.com

Mathew Klein, M.S., Founder (1916-1996)
Harvey Klein, M.S., Laboratory Director

REPORT OF ANALYSIS

REPORT # 350720003.0
CLIENT # JER07
DATE SUBMITTED: 7/20/15

TO: Jersey Mechanical Contractors
5006 Industrial Road

Farmingdale NJ 07727
ATT: Robert Butler

SAMPLE TYPE: WATER, GRAB SAMPLE
SAMPLE ID: BASEMENT
SAMPLE LOCATION:

DATE SAMPLED: 7/20/15 TIME SAMPLED: 09:45

ANALYSIS	RESULT	UNITS	MCL	DATE ANALYZED
Total Coliform, Col.18, SM9223B	<1	organisms/100ml	<1	7/20/15-15:50
Heterotrophic Plate Ct., SM9215B	280	cfu/ml	Rec. <500	7/20/15-15:50

< = less than, not detected. This sample(s) conforms to State and Federal drinking water standards.
MCL = Maximum Contaminant Level allowed by State and Federal regulations.

Harvey Klein

286775

July/August 2015 – Yellow water or yellow stain in toilets in different areas of the building, no actions taken, assumption made that it was due to lack of flushing by on-site crew

August 13th, 2015 – Jersey Mechanical Contractors Initial Chlorine flush and full system Flush.

October 2015 – Biotrial started to occupy the building in October 2015 at which time it became apparent that the yellow/brown/murky water was NOT due to the crew onsite. Testing requested to determine the safety of drinking the water as well as determine cause of the color.

October 26th, 2015 – tests taken by Jersey Mechanical in basement and 4th Floor, analyzed by Garden State Laboratories, Inc.

November 13th, 2015 – Garden State Laboratories, Inc. results returned showing elevated levels of Heterotropic Bacteria

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Harvey Klein, M.S., Laboratory Director

REPORT OF ANALYSIS

REPORT # 351026012.0
CLIENT # JER07
DATE SUBMITTED: 10/26/15

TO: Jersey Mechanical Contractors
5006 Industrial Road

Farmingdale NJ 07727
ATT: Robert Butler

SAMPLE TYPE: WATER, GRAB SAMPLE
SAMPLE ID:
SAMPLE LOCATION: BASEMENT - BIOTRIAL

DATE SAMPLED: 10/26/15 TIME SAMPLED: 12:28

ANALYSIS	RESULT	UNITS	MCL	DATE ANALYZED
Total Coliform, Col.18, SM9223B	<1	organisms/100ml	<1	10/26/15-17:05
Heterotrophic Plate Ct., SM9215B	3200	organisms/ml	Rec. <500	10/26/15-17:05

< = less than, not detected. This sample(s) conforms to State and Federal drinking water standards.
MCL = Maximum Contaminant Level allowed by State and Federal regulations.

290370

The liability of Garden State Laboratories, Inc. for services rendered shall in no event exceed the amount of the invoice.
Certified by NJ Dept. of Health, NJDEP #20044, NY Dept. of Health #11550 and PADEP #68-03680.

Garden State Laboratories, Inc.

Bacteriological and Chemical Testing
410 Hillside Avenue
Hillside, New Jersey 07205

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Mathew Klein, M.S., Founder (1916-1996)
Harvey Klein, M.S., Laboratory Director

REPORT OF ANALYSIS

REPORT # 351026013.0
CLIENT # JER07
DATE SUBMITTED: 10/26/15

TO: Jersey Mechanical Contractors
5006 Industrial Road

Farmingdale NJ 07727
ATT: Robert Butler

SAMPLE TYPE: WATER, GRAB SAMPLE
SAMPLE ID:
SAMPLE LOCATION: 4TH FLOOR - BIOTRIAL

DATE SAMPLED: 10/26/15 TIME SAMPLED: 12:30

ANALYSIS	RESULT	UNITS	MCL	DATE ANALYZED
Total Coliform, Col.18, SM9223B	<1	organisms/100ml	<1	10/26/15-17:05
Heterotrophic Plate Ct., SM9215B	21000	organisms/ml	Rec. <500	10/26/15-17:05

< = less than, not detected. This sample(s) conforms to State and Federal drinking water standards.
MCL = Maximum Contaminant Level allowed by State and Federal regulations.

290370

The liability of Garden State Laboratories, Inc. for services rendered shall in no event exceed the amount of the invoice.
Certified by NJ Dept. of Health, NJDEP #20044, NY Dept. of Health #11550 and PADEP #68-03680.

November 18th, 2015 – Contact made with the City of Newark and met onsite for discussion. Fire hydrant was flushed and recommended made that the building entirely flushed.

November 19th/20th, 2015 – Full system clear water flush.

November 23rd, 2015 – Water sample taken by the City of Newark and Jersey Mechanical and analyzed by Garden State Laboratories, Inc.

December 1st, 2015 - City of Newark test results retuned

CITY OF NEWARK
Mayor Ras J. Baraka

Department of Water and Sewer Utilities **A City We Can All Believe In**

Andrea Hall Adebowale
Director

Bio trial / Eurest Services
130 Norfolk St.
Newark, NJ 07103

December 1, 2015

Dear Mr. Nurse,

This letter will serve to inform you of the acceptable test results of the water sample that was collected in the City of Newark at 130 Norfolk St. Newark N.J. by the City of Newark Water testing Laboratory employee on November 23, 2015. The results are as follows:

Location	pH, Units	Residual Chlorine, ppm	Turbidity, NTU	Color (Color units)	Bacteriological Total coliform colonies per 100ml of sample
Kitchen Sink	7.26	1.01	0.368	4	Absence

We attest that sample meets the New Jersey Department of Environmental Protection potable water standards.

Very truly yours,

Selene Samuel

Selene Samuel, Chemist

Division of Sewers/Water Supply

cc: Andrew Pappachen, Director of Public Works

December 4th, 2015 - Garden State Laboratories, Inc. results returned

Garden State Laboratories, Inc.

Bacteriological and Chemical Testing
410 Hillside Avenue
Hillside, New Jersey 07205

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Mathew Klein, M.S., Founder (1916-1996)
Harvey Klein, M.S., Laboratory Director

REPORT OF ANALYSIS

REPORT # 351123002.0
CLIENT # JER07
DATE SUBMITTED: 11/23/15

TO: Jersey Mechanical Contractors
5006 Industrial Road

Farmingdale NJ 07727
ATT: Robert Butler

SAMPLE TYPE: DRINKING WATER, GRAB SAMPLE
SAMPLE ID: BASEMENT 1
SAMPLE LOCATION: 130 NORFOLK ST., NEWARK, NJ

DATE SAMPLED: 11/23/15 TIME SAMPLED: 11:00

ANALYSIS	RESULT	UNITS	MCL	DATE ANALYZED
Total Coliform, Col.18, SM9223B	<1	organisms/100ml	<1	11/23/15-14:54
Heterotrophic Plate Ct., SM9215B	10	cfu/ml	Rec. <500	11/23/15-14:54

< = less than, not detected.
MCL = Maximum Contaminant Level allowed by State and Federal regulations.

291246

The liability of Garden State Laboratories, Inc. for services rendered shall in no event exceed the amount of the invoice.
Certified by NJ Dept. of Health, NJDEP #20044, NY Dept. of Health #11550 and PADEP #68-03680.

Garden State Laboratories, Inc.

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Mathew Klein, M.S., Founder (1916-1996)
Harvey Klein, M.S., Laboratory Director

REPORT OF ANALYSIS

REPORT # 351123003.0
CLIENT # JER07
DATE SUBMITTED: 11/23/15

TO: Jersey Mechanical Contractors
5006 Industrial Road

Farmingdale NJ 07727
ATT: Robert Butler

SAMPLE TYPE: DRINKING WATER, GRAB SAMPLE
SAMPLE ID: ~~BASEMENT~~ 4th Floor
SAMPLE LOCATION: 130 NORFOLK ST., NEWARK, NJ

DATE SAMPLED: 11/23/15 TIME SAMPLED: 11:00

ANALYSIS	RESULT	UNITS	MCL	DATE ANALYZED
Total Coliform, Col.18, SM9223B	<1	organisms/100ml	<1	11/23/15-14:54
Heterotrophic Plate Ct., SM9215B	10	cfu/ml	Rec. <500	11/23/15-14:54

< = less than, not detected.
MCL = Maximum Contaminant Level allowed by State and Federal regulations.

291246

December 14th, 2015 – Persistent yellow water

4th Floor:

December 18th, 2015 – Buro Happold (Mechanical Engineers for the project design) made a site visit and confirmed persistent water coloration problem in the building, decision was made to perform a chemical flush on the system over the holiday break.

December 29th, 2015 – Clarity Water Technologies Chlorine flush and full system Flush

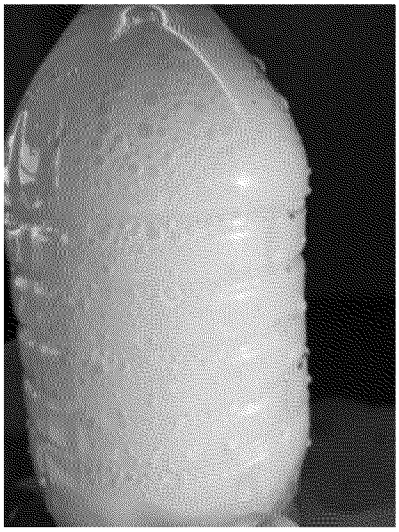
January 4th, 2016 – Clarity Water Technologies report (see **Appedix 1**), "Before treatment, the domestic water had iron levels above 2.5-ppm in most locations."

January 6th, 2016 – Despite chemical flush, persistent yellow and now frothy water (iron levels worst on 3rd floor: 3.31-ppm) Clarity water technologies full system Flush

Entry point in Basement:

3rd Floor:

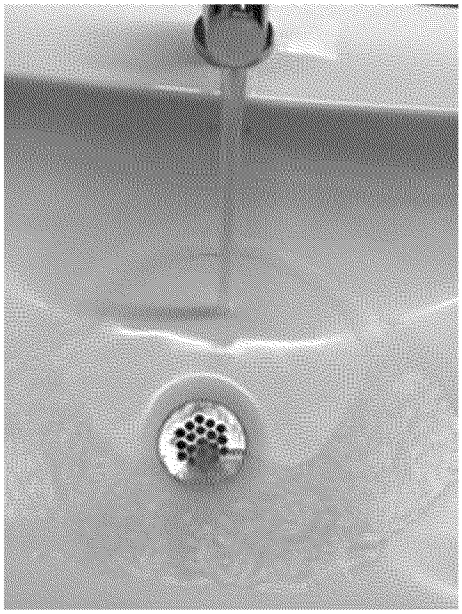
4th Floor:

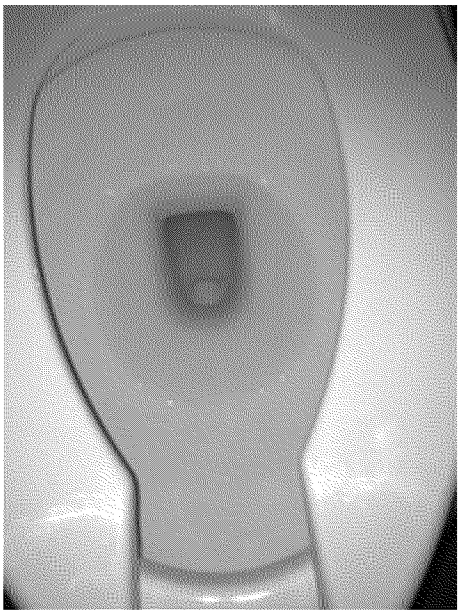


January 11th, 2016 – Clarity Water Technologies full system Flush

January 12th, 2016 – Persistent yellow water

4th Floor:



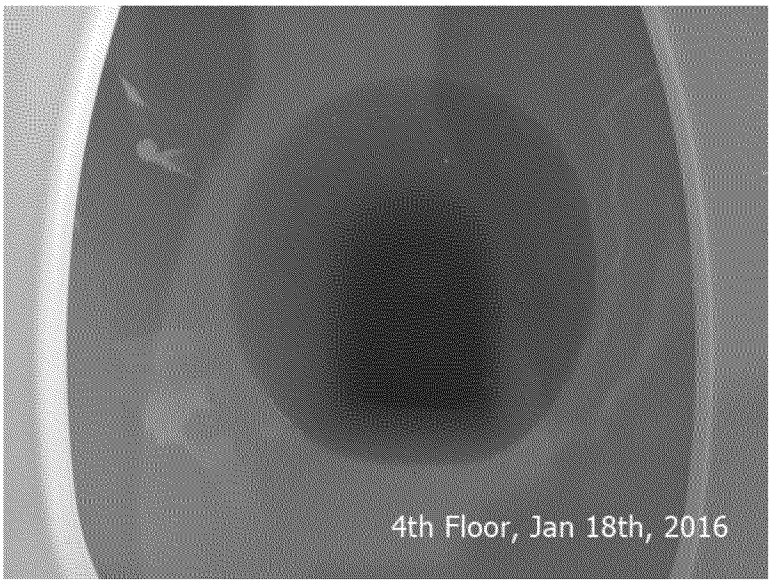


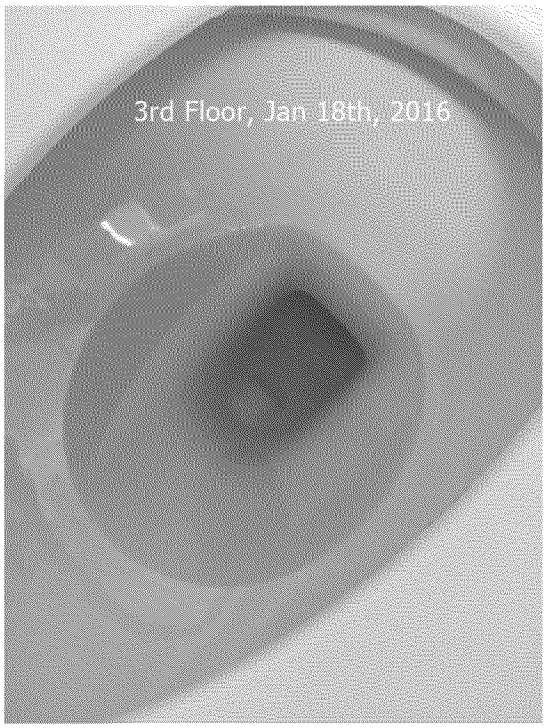
January 13th, 2016 – GC confirmed that fire protection contractor checked all backflow preventers and found them to be working properly. Persistent yellow water.

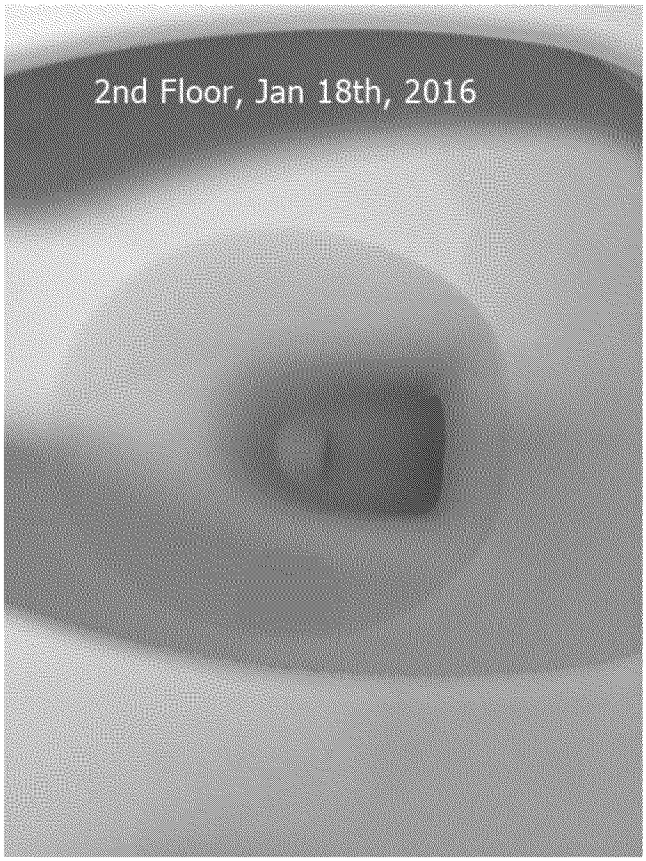
4th Floor:

January 14th, 2016 - Jersey Mechanical Contractors full system Flush

January 18th, 2016 – Persistent yellow water







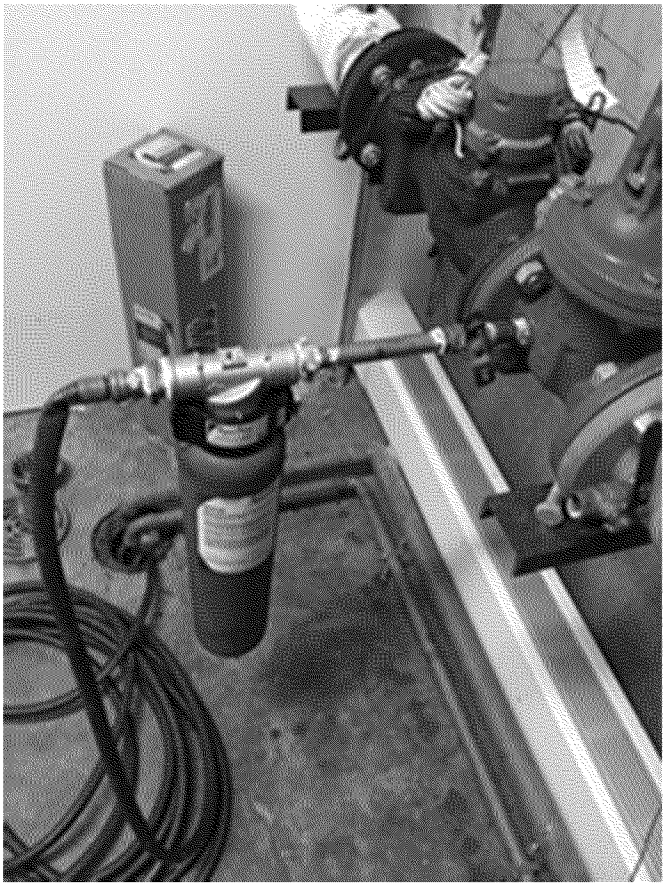
January 23rd, 2016 – Clarity Water Technologies report (see **Appendix 2**)

January 27th, 2016 – 1Source Safety and Health contracted to assist in locating the cause of the water issue.

February 2nd, 2016 – Onsite meeting with 1Source, Jersey Mechanical, Natoli & Biotrial staff to identify next steps in resolving issue.

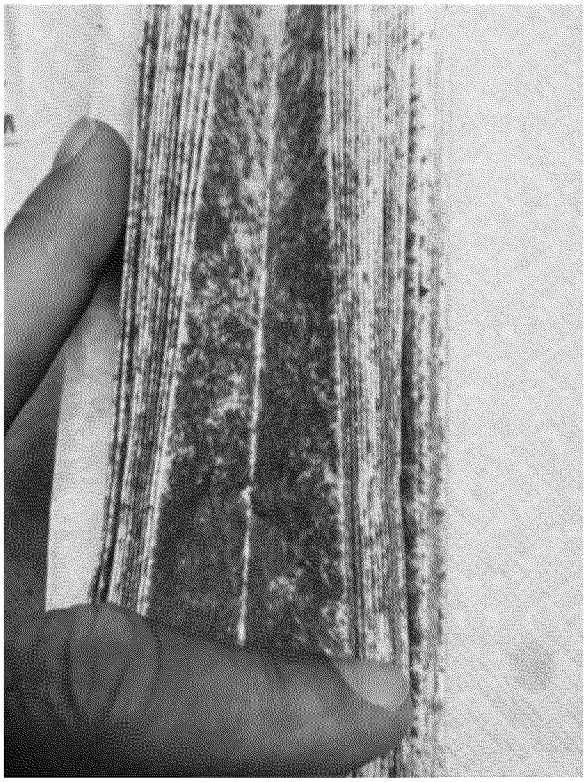
February 26th-March 3rd, 2016 – 5 micron filter installed before back flow preventer, water run through filter continuously. Over the course of one day during this week, 19 water samples were taken from the flow of water after the filter. The water sample as well as the contents analyzed and the results received March 9th. The soluble iron from the 19 samples ranged from under 0.02 to 0.29 mg/l (see **Appendix 3**), and the iron content on the filter was very high – 2,320 mg/kg.

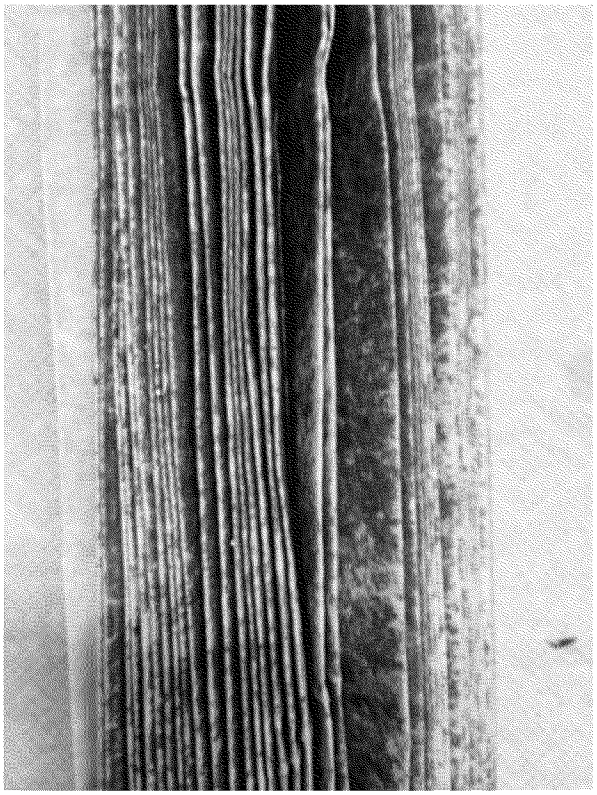
The filter installed on February 26th:

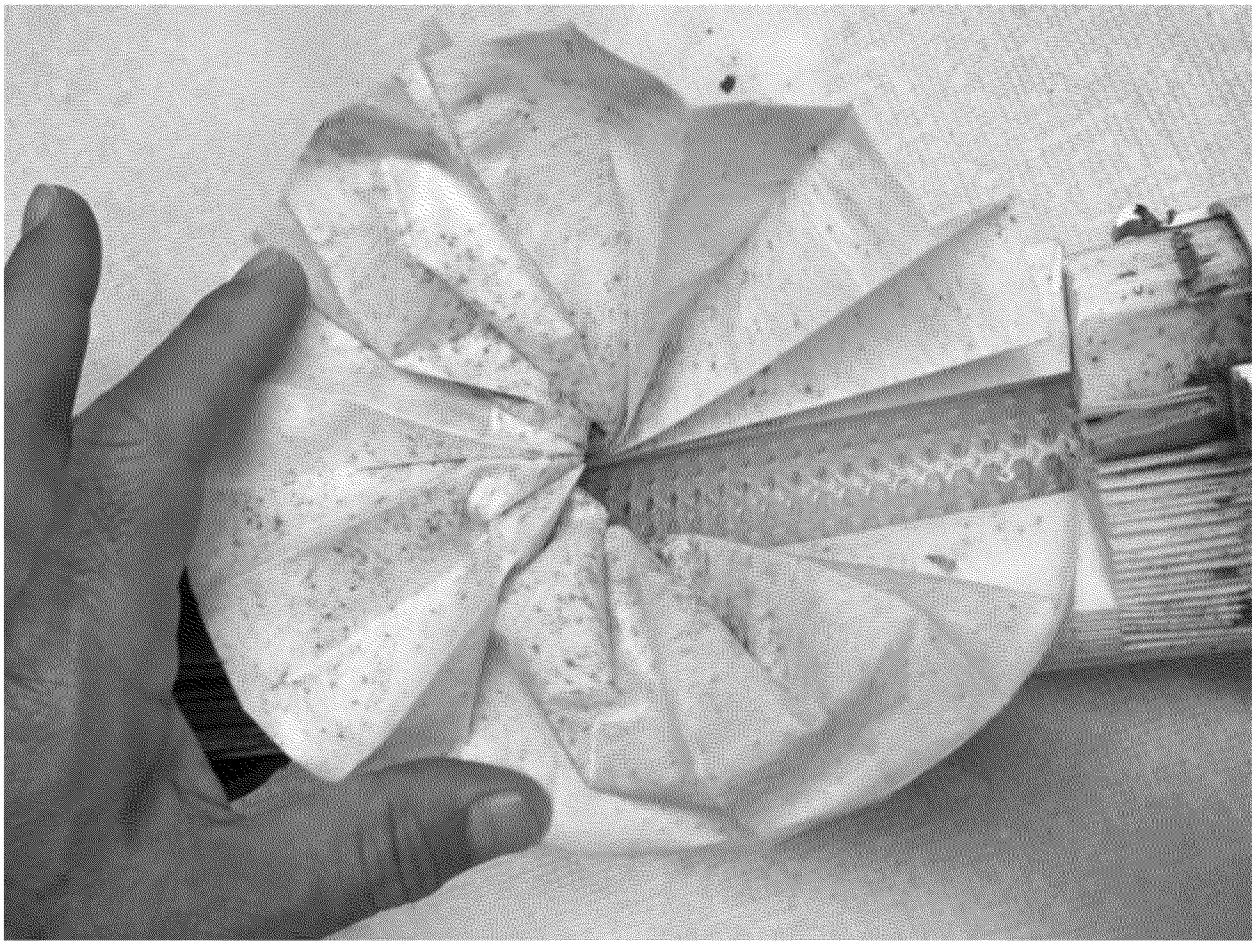


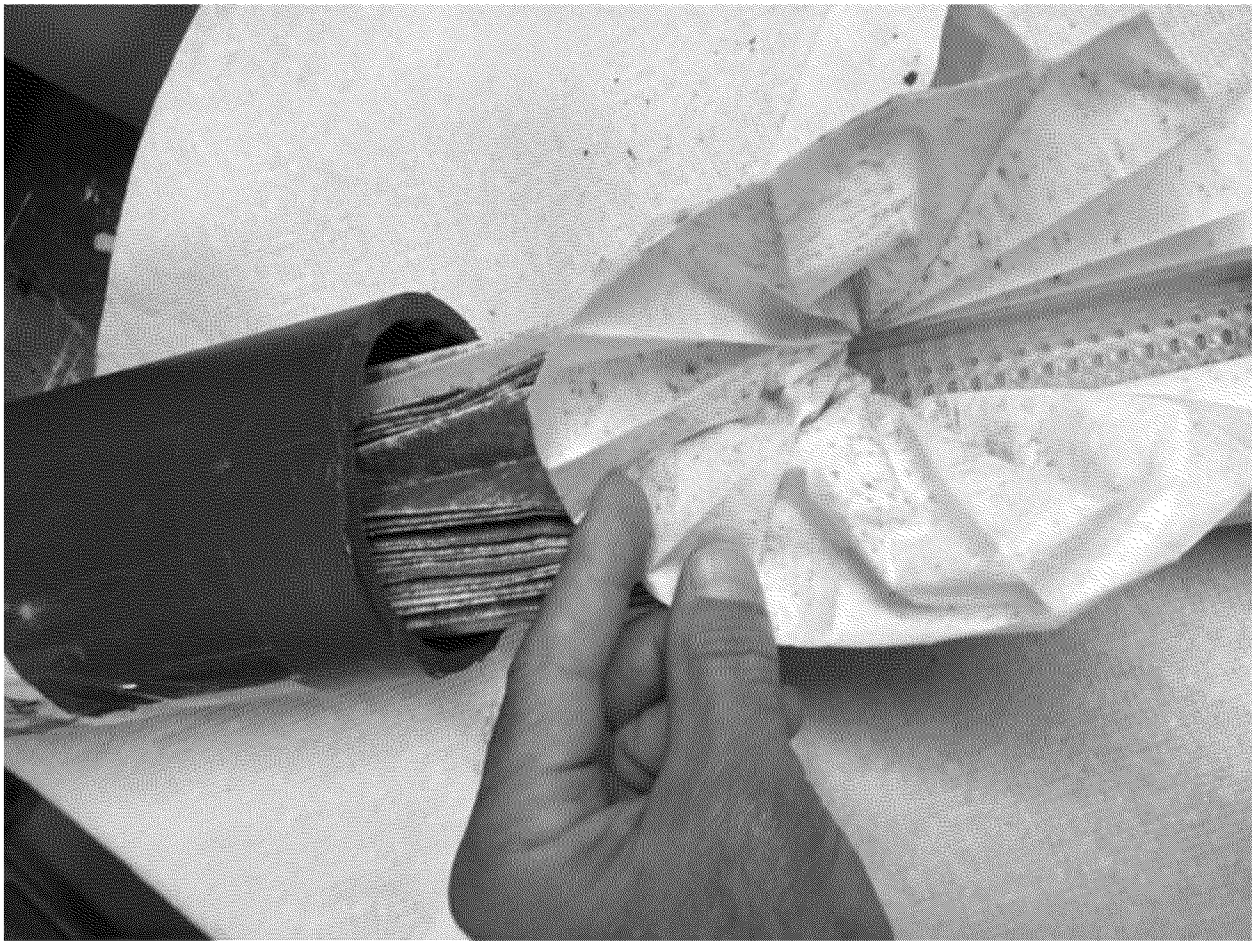
The contents of the filter on March 3rd:

The contents of the filter on March 3rd (continued):



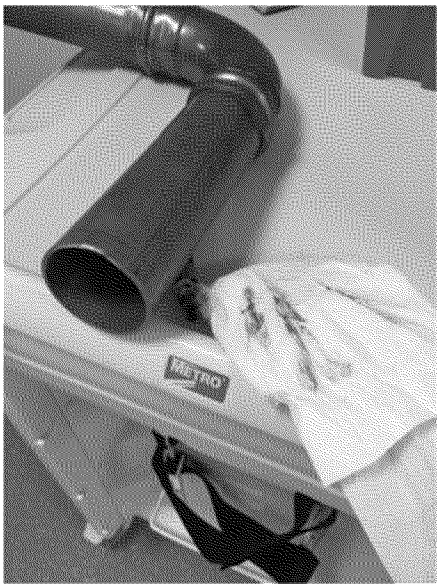




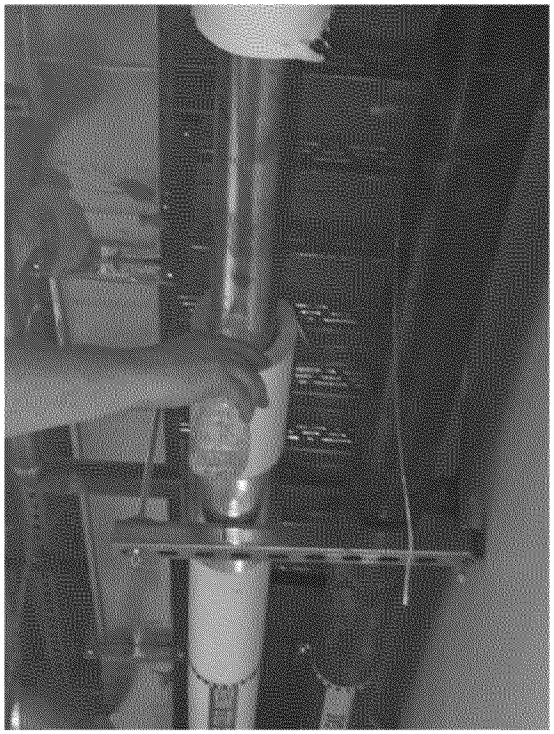


March 18th, 2016 – Water shut down to the building and water pipes cut on the 3rd floor and basement to determine level of sediment in the pipes.

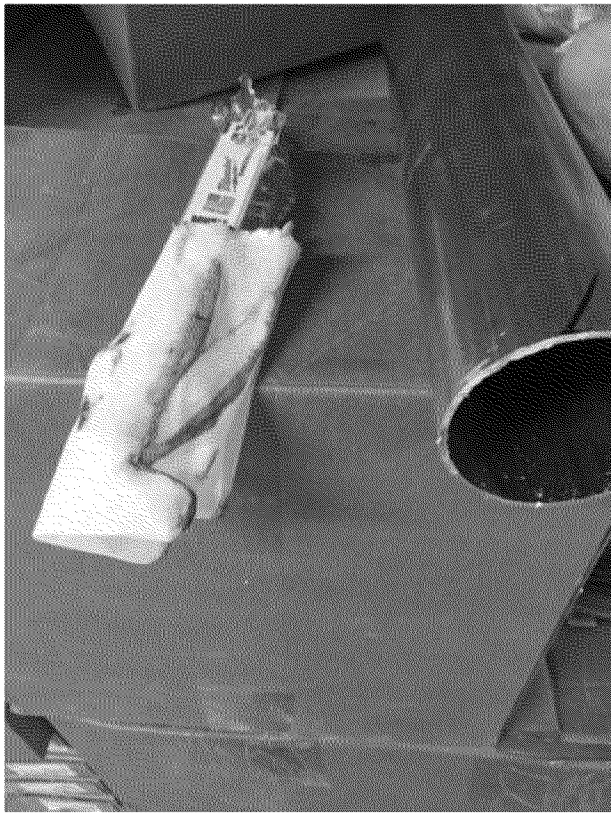
- 2" Pipe from 3rd Floor By Men's Room. Pipe cut with a pipe cutter. No slime layer on vertical or horizontal portion of cut out elbow. Wipe test only showed iron residue on horizontal section. Vertical section wipe test was a slight gray color.

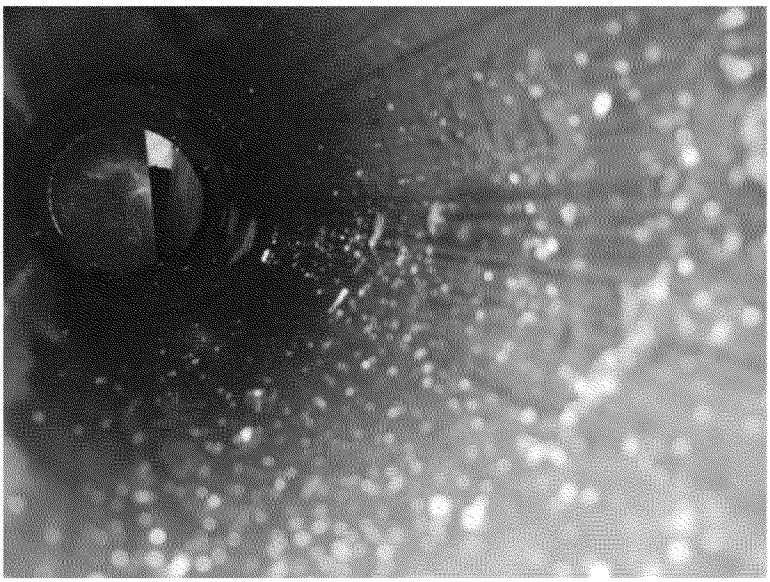


- 3" Pipe from basement. Pipe was cut with a reciprocating saw. No slime layer. Note yellow color of water dripping into plastic bottle from the pipe as it was being cut.
- Heavier deposition of residue is clearly seen in the pipe within the brackets. Copper fines from the sawing are also seen in the inside of the pipe. White flakes are from paint abraded off of new saw blade.



- Wipe of inside of the 3" pipe shows deposition residue.
- Inside of pipe shows discoloration of copper likely due to treatment with chlorine dioxide.





March 23rd, 2016 – Contact made with the City of Newark to seek resolution to the iron particle problem.

March 24th, 2016 – Onsite visit from the City of Newark. Hydrant flushed for ½ hour. Contact made with the State of New Jersey to seek assistance in finding resolution to iron particle problem.

March 30th, 2016 – Hydrant flushed in street and then samples taken in building on 1st floor.

April 4th, 2016 – Meeting onsite with City of Newark, NJDEP. Results to the March 30th sampling returned. New samples taken from basement (before and after booster pump) and from hydrant.

CITY OF NEWARK
Mayor Ras J. Baraka

Department of Water and Sewer Utilities
Andrea Hall Adebowale
Director
Division of Water Supply
612 Ridge Road
Cedar Grove, NJ 07009
973-239-4493

A City We Can All Believe In

CITY OF NEWARK WATER DEPT
PWS ID# 0714001
LAB ID# 07014

Report of analysis: Samples from the following locations were collected on 03/30/2016

Location: 130 Norfolk Street after the meter

ANALYSIS	RESULT	UNITS	METHOD	DATE ANALYZED
Turbidity	0.358	NTU	EPA 180.1	03/30/2016
Color	3	CU	SM 2120 B	03/30/2016
Alkalinity	30.2	mg CaCO3/L	SM 2320 B	03/30/2016
Total Hardness	50.4	mg CaCO3/L	SM 2340 C	03/30/2016
Iron	0.89	mg/L	EPA 200.9	03/30/2016

Location: Hydrant Norfolk St & Bond St.

ANALYSIS	RESULT	UNITS	METHOD	DATE ANALYZED
Turbidity	0.243	NTU	EPA 180.1	03/30/2016
Color	2	CU	SM 2120 B	03/30/2016
Alkalinity	30.4	mg CaCO3/L	SM 2320 B	03/30/2016
Total Hardness	50.8	mg CaCO3/L	SM 2340 C	03/30/2016
Iron	0.013	mg/L	EPA 200.9	03/30/2016

Selene Samuel
City of Newark

CITY OF NEWARK
Mayor Ras J. Baraka

Department of Water and Sewer Utilities
Andrea Hall Adebowale
Director
Division of Water Supply
612 Ridge Road
Cedar Grove, NJ 07009
973-239-4493

A City We Can All Believe In

CITY OF NEWARK WATER DEPT
PWS ID# 0714001
LAB ID# 07014

Coliform Result
Location: 130 Norfolk Street
Sample Date 03/31/2016
Analysis Date 03/31/2016
Analysis Completed Date 04/01/2016

Location	pH, Units	Residual Chlorine, ppm	Turbidity, (NTU)	Color (CU)	Bacteriological Total coliform colonies per 100ml of sample
Janitor Closet	7.53	0.26	1.89	8	Absence

April 8th, 2016 – Water shut off valve replaced in basement by Jersey Mechanical as it was leaking**.** City water shut off for approximately 1 hour to allow for replacement to be made.

April 12th, 2016 – Electrical testing for stray current conducted by Mehl on ductile iron piping (water entry point) and on main electrical panel. No anomalies were reported.

April 13th, 2016 – Results received from the City of Newark April 4th sampling.

CITY OF NEWARK
Mayor Ras J. Baraka

Department of Water and Sewer Utilities **A City We Can All Believe In**
Andrea Hall Adebowale
Director

Division of Water Supply
612 Ridge Road
Cedar Grove, NJ 07009
973-239-4493

CITY OF NEWARK WATER DEPT
PWS ID# 0714001
LAB ID# 07014

Report of analysis:
Samples from the following locations were collected on 04/04/2016

Location: 130 Norfolk Street by the meter

ANALYSIS	RESULT	UNITS	METHOD	DATE ANALYZED
Turbidity	0.166	NTU	EPA 180.1	04/04/2016
Color	2	CU	SM2120 B	04/04/2016
Total Coliform per 100ml	Absence	--	SM 9222 B	04/04/2016
HPC per ml	2	--	SM 9215 B	04/04/2016

Location: 130 Norfolk Street by meter pump

ANALYSIS	RESULT	UNITS	METHOD	DATE ANALYZED
Turbidity	0.168	NTU	EPA 180.1	04/04/2016
Color	2	CU	SM2120 B	04/04/2016

Location: 130 Norfolk Street fire Hydrant

ANALYSIS	RESULT	UNITS	METHOD	DATE ANALYZED
Turbidity	0.102	NTU	EPA 180.1	04/04/2016
Color	2	CU	SM2120 B	04/04/2016

Selene Samuel
City of Newark

April 27th, 2016 – At the request of the DEP, ACS Underground was contracted to perform a video inspection of the pipe connecting the building to the main in the street. This inspection was recorded. The same day, the City of Newark and Jersey Mechanical took simultaneous water samples from basement and 4th floor. Final results have not yet been returned.

May 4th, 2016 – Condition of water, 2nd floor:

May 5th, 2016 – ACS provided the report from the inspection which showed that that no anomalies were found in our pipe, however, there is a visible trail of sediment that increases as the camera got closer to the shutoff at the main:

REPORT

WATERLINE INSPECTION

LOCATION:
130 NORFOLK STREET
NEWARK, NJ

FOR

MR. OWEN NURSE

BIOTRIAL INC
130 NORFOLK STREET
NEWARK, NJ 07103

Office: 973-388-2848
E-Mail: Owen.Nurse@biotrial.com

Report Prepared By:

ACS
(Admiral Conservation Services II, Inc.)
PO Box 448 Georgetown, CT 06829 203.544.7190
www.acsunderground.com

APRIL 2016

BACKGROUND

Admiral Conservation Services (ACS) was commissioned by Owen Nurse for inspecting a waterline at 130 Norfolk Street in Newark, New Jersey. This inspection took place for visually determining the inside pipe conditions for any possible breaks, cracks, bellies, silt deposits, sediments and/or debris. This is the report outlining the overall approach, work summary, and recommendations.

OVERALL APPROACH

The ACS technician first investigated the worksite then conducted a manual camera inspection on a domestic waterline running from a basement valve to a street valve. Once access was gained into the line, a 1" camera was directly inserted for visually viewing the interior pipe condition. These images were simultaneously viewed on a nearby monitor and recorded.

WORK SUMMARY*

April 27, 2016: The ACS technician first investigated the worksite then conducted a manual camera inspection on a 3" service line running approximately 37.1 feet from the basement valve to the first roadway valve:

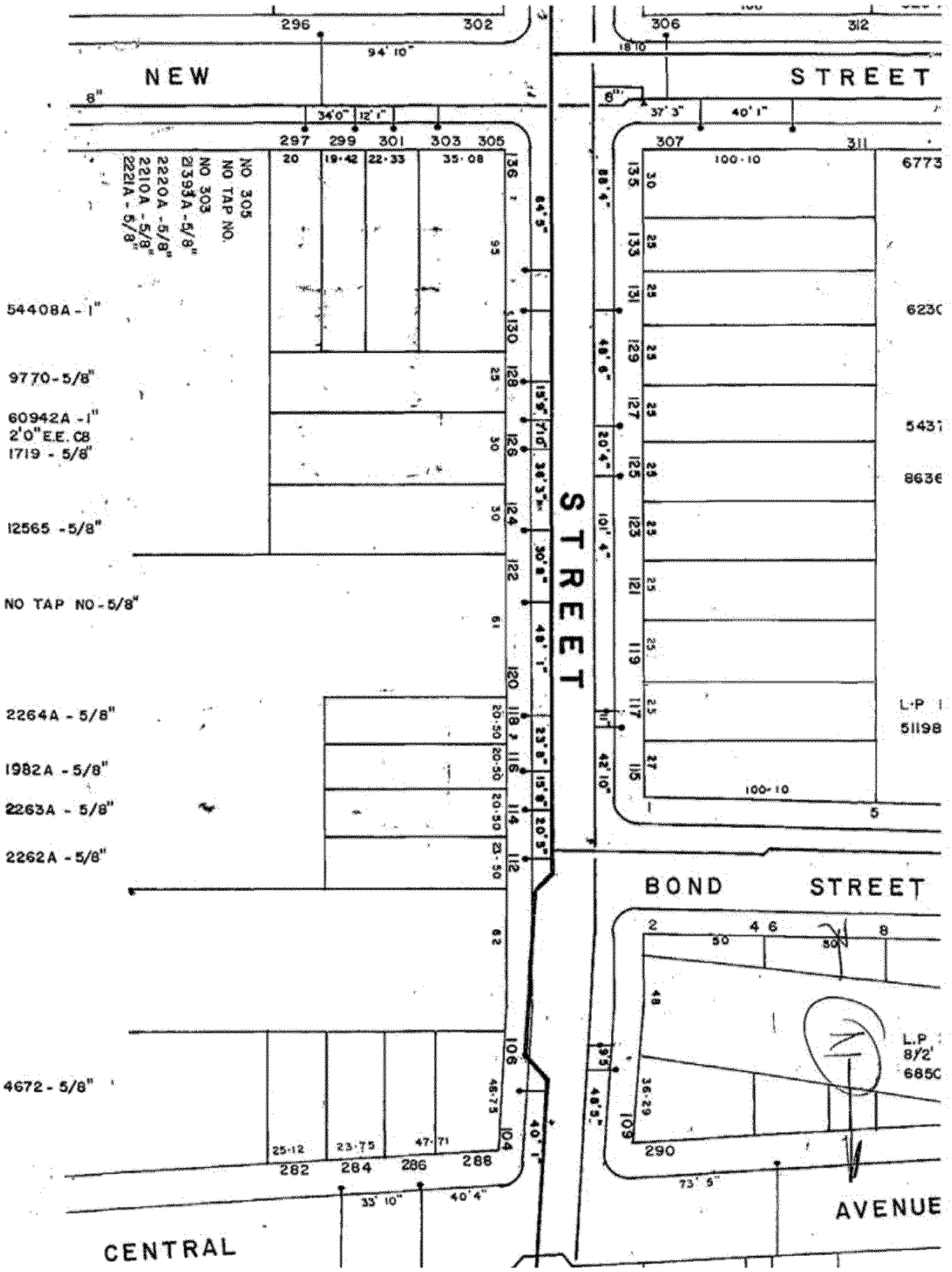
- Camera inserted at removed valve located in basement of building.
- 15.2' mark pipe changed from 3" copper to 3" ductile iron pipe (DIP). Pipe clear.
- 21.6' mark encountered 90° elbow, turn headed towards roadway. Pipe clear.
- 37.1' mark reached 1st shutoff valve in roadway. From elbow, sediment observed steadily increasing as camera continued towards valve. No pipe cracks, bellies, and/or damage detected.

RECOMMENDATIONS

ACS recommends continuing service line inspection from 1st shutoff valve to the water main located in the roadway for determining root cause of pipe sediment. Drawings of the water system should be obtained from the local Water Company for determining if this waterline is configured for thorough flushing and/or if negatively impacted during nearby hydrant flushing and/or water main repairs. It is also recommended for investigating if the 20" water main located in the roadway is lined or unlined, and if proper corrosion control is being performed and maintained.

**Inspection video recording and site photos were provided directly to Biotrail Inc.*

May 12th, 2016 – Upon reviewing a water network engineering drawing (see below, provided by the City of Newark when the city required for old tie-in lines to be capped), it was remarked that it appears that Biotrial is the only entity on the block to be tapped into the 20" service line. All other businesses and residences are tapped into an 8" service line across the street.



May 16th, 2016 – Given continued concerns regarding lead, a section of the filter from the end of February/beginning of March was analyzed for lead. The results, which include the weight of the filter in the total overall weight, showed 3 mg/kg (a concentration which would be significantly higher if it could be effectively separated from the filter):

CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: Christian Schneider
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Sample Desc: Water Filter Media

Date of Report: 05/16/16
Lab ID: 1990-16-0017863

Date Collected: 05/05/16 00:00
Collected By: CLIENT

Date Received: 05/09/16 10:20

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Lead, Total	3	mg/kg	1	1	SW846 6010	05/14	00:09	HRG

Distribution of Reports:

Reviewed and Approved by:

Bradley Griffiths
Account Executive & Marketing

THE NELAC INSTITUTE

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
PHONE: 610-374-5129 • FAX: 610-374-7234 • **www.mjreider.com**

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ACIL Seal of Excellence

M. J. Reider Associates, Inc.
107 Angelica Street
Reading, PA 19611
Phone: 610-374-5129 FAX: 610-374-7234

CHAIN OF CUSTODY RECORD
Please Print Legibly
(INSTRUCTIONS ON BACK OF THIS FORM)
DISTRIBUTION: White: Report; Yellow: Lab; Pink: Submitter

R 33158

Page 1 of 1

6. Report Type: ☑ Routine ☐ Standard QC ☐ Data Package

7. Turnaround Time: ☑ Standard RUSH: / /

1. Client (Company or Individual): 1Source Safety & Health, Inc
Address: 140 S. Village Ave Suite 130
City: Exton State: PA ZIP: 19341 Phone: 610.524.5724 FAX:

2. Invoice To: (If different from above) Acct 1990
Address:
City: State: ZIP: Phone: FAX:

3. Client Project Name / #: B10T 0001
4. P.O. No.: B10T0001
5. Sampled By: C Schneider

Matrix Code (for item 12)	Container Codes (for item 13) SIZE	TYPE	Preservative Code (for item 14)	
DW = Drinking Water	2L = 2 Liter	V = VOA vial	A = Ascorbic Acid	T = NaS2O3
GW = Ground Water	L = Liter	G = Glass	C = HCl	E = EDTA
WW = Waste Water	500 = 500ml	P = Plastic	N = HNO3	L = NH4Cl
S = Soil	250 = 250ml	M = Micro	S = H2SO4	Z = Zinc Acetate
O = Other Filter	125 = 125ml	O = Other	P = H3PO4	V = Ascorbic/HCl
	40 = 40ml		H = NaOH	O = Other
			M = Monochloroacetic Acid	

Sample Receipt Information:
Temperature @ 4C? Y (N) 21C
Samples received on ice? Y (N)
Sample Containers Intact? (Y) N
VOC's Free of Headspace? Y N
COC Seal intact or attached? Y N

Samples Shipped or Hand Delivered:
Method of Shipment: FedEx
Tracking #: 7762 8384 8263
Cooler Return Fee:
ICE CHEST NUMBER:
Checked by:

8. COMPLIANCE PURPOSE:
☐ Public Drinking Water: PA SDWA Forms Required ☐ FHA/Realty
PWSID # ________ ☐ NPDES

17. SPECIAL INSTRUCTIONS/COMMENTS: 1x envelope - no time on sample container

MJRA ID #	9. Sample Description	10. Date	Time	11. Composite	Grab	12. Matrix	16. Total # of Containers	15. Analyses Requested
17863	Water Filter Media	5/5/16	—			O	1	Lead

13. Container: Size / Type
14. Preservative

18. RELINQUISHED BY	19. RECEIVED BY	DATE	TIME
Chris Schneider		5/6/16	4pm
	[signature]	5.9.16	1020

Entered by: Approved by: Comment:

The Client, by signing, or having client's agent sign, this Chain of Custody Form, agrees to pay for the above requested services per the MJRA Price List or Quotation provided including any and all attorney fees if collection becomes necessary.

May 18th, 2016 – Project report received from 1Source Safety and Health, Inc. (see **Appendix 4**)

APPENDIX 1

50 North Harrison Avenue, Suite #10 Congers, NY 10920 Ph: 888 616-3545 E-Mail: accounting@claritywatertech.com

January 4, 2016

Mr. Robert C. Butler
Jersey Mechanical Contractors, Inc.
5006 Industrial Road
Farmingdale, New Jersey 07727

Via E-mail: Rcbutler@jerseymechanicalcontractors.com

Re: Biotrial Domestic Water Sterilization Report

Dear Rob:

On Tuesday, December 29, 2015, Clarity Water Technologies, LLC provided a team to chemically sanitize and flush the domestic water system at BioTrial – USA, 130 Norfolk Street, Newark, NJ 07103 from 8:00 am to 4:30 pm.

Two issues were detailed as concerning for the facility that prompted this project. The first was high heterotrophic plate counts (microbiological counts) returned from a recent test, and the second was a yellowish to brownish tint to the water, primarily on the 3rd floor, a floor that has had little to no occupancy, and the lab in the Basement.

The metallurgy of the domestic water system is entirely copper, with the exception of the main water supply to the feed water pumps in the basement, which is black pipe.

Before treatment, the domestic water had iron levels above 2.5-ppm in most locations. This would produce a yellowish tint visible to the naked eye. Since the system metallurgy is copper, this iron was suspected to be coming from the city water make-up. The city water supply directly from the inlet into the building had an iron level of 1.8-ppm and a free chlorine residual of 0.36-ppm. Both of these levels are higher than usual for a typical make-up source, but not necessarily out of range. The individual fixtures, however, are where the higher iron levels were recorded.

Since the building was unoccupied during the week between Christmas and New Year's Day, Clarity Water Technologies, LLC injected a chlorine dioxide solution into the domestic water supply for the building. This was injected down-line of the back flow prevention device. A system pump was bumped manually to facilitate draw into the system, and all three water system were treated. These include the cold water system, the 110°F hot water (for the facility), and the 140 °F hot water (exclusive to kitchen).

After walking the facility, and connecting our feed equipment, the chemical injection of the product was started at 11:00 am and circulated until 3:00 pm. At this time, all systems were flushed to remove the added product, the biofilm that the product had penetrated and stripped from the pipe walls, and other contaminants (i.e. iron, copper). This flushing process was completed at 4:00 pm.

During injection and circulation, all fixtures were opened and tested to obtain a chlorine dioxide level of at least 3-5 ppm. Once this was obtained at each fixture, the fixture was closed to allow for contact time.

During flushing, all samples were tested to obtain a maximum chlorine dioxide level of 0.8-ppm. All three systems were continuously flushed from all fixtures to quickly remove any remaining product. In fact, all post procedure tests yielded chlorine dioxide levels at or below 0.29-ppm, with most samples yielding levels between 0.02-ppm and 0.1-ppm. The EPA maximum threshold for drinking water is 0.8-ppm.

Iron and copper levels were also tested post procedure and returned levels of 0.1-ppm to 0.49-ppm, and 20-ppb to 32-ppb respectively. Water was analyzed visually as well, and all water samples returned a clear sample as evidenced in pictures.

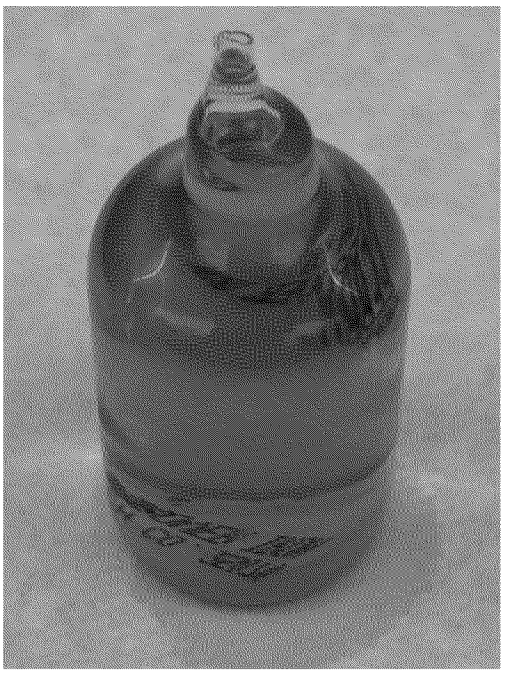
At the conclusion of this process, two samples were taken, one each from the primary areas of concern, the 3rd floor and the basement lab, and sent to a national lab for a heterotrophic plate count. The results are attached and both samples yielded counts of 0 cfu's/ml (colony forming units per milliliter).

Please call me with any questions.

Best regards,

Greg Frazier
Clarity Water Technologies, LLC
201 697-8097

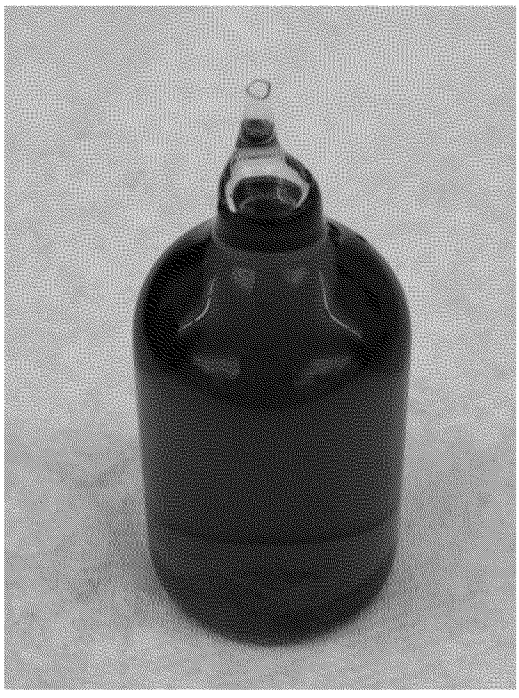
Domestic City Iron



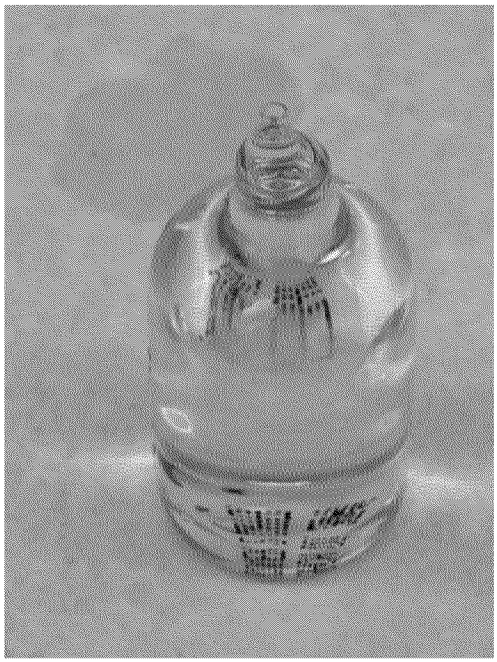
System Iron

During Cleaning

System Free Chlorine



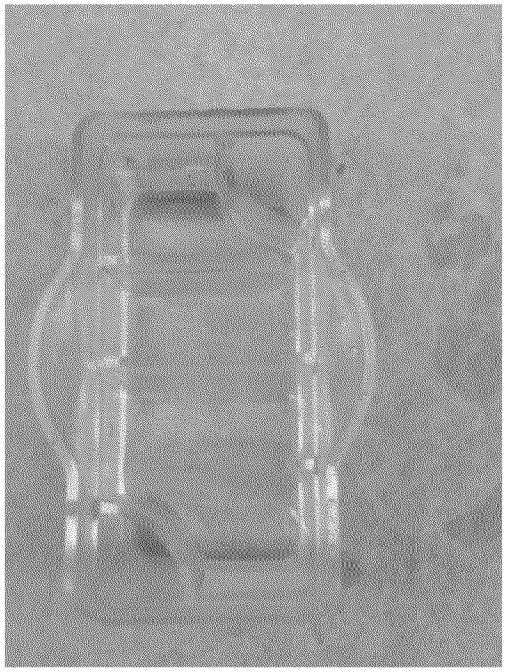
System Copper

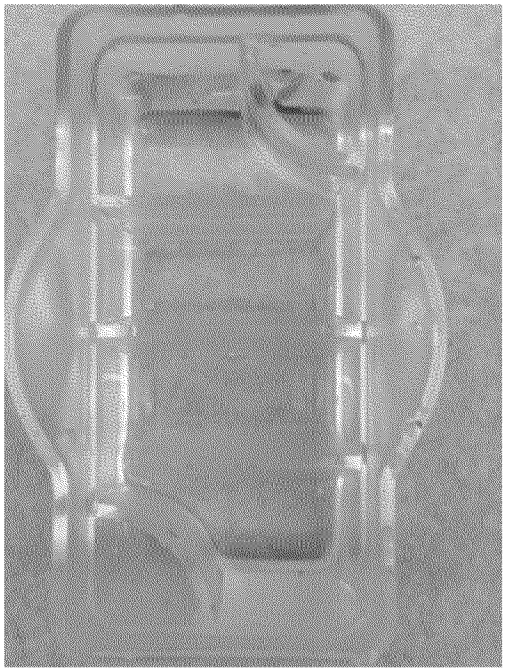


After Cleaning

Iron Cold Water

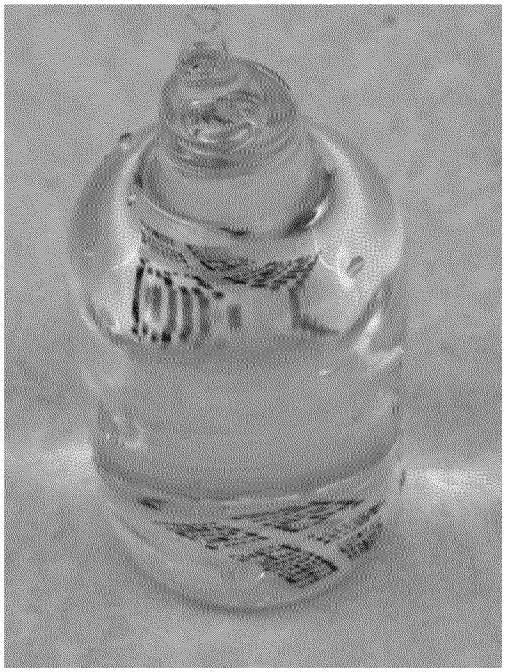
Copper Cold Water





Cold Water Visual 3rd Floor

Hot Water Visual 3rd Floor



Iron 3rd Floor

Dipslide - 48 hours No Growth

Aerobiology Laboratory Associates, Incorporated
Expertise Since 1997

Certificate of Analysis
EMLAP #102747

Pure Earth Lab
7184 North Park Dr.
Pennsauken, New Jersey 08109
(856) 486-1177
www.aerobiology.net

Clarity Water (Congers, NY)
50 N. Harrison Ave.
Congers, New York 10920
Attn: Greg Frazier
Project: **BIO TRIAL NEWARK NJ**
Condition of Sample(s) Upon Receipt: Acceptable

Date Collected: 12/29/2015
Date Received: 12/30/2015
Date Analyzed: 01/01/2016
Date Reported: 01/04/2016
Project ID: 15034182

Client Sample #: 1
Lab Sample #: 15034182-001
Sample Location: 3RD FLOOR MENS
Test: 2056, Water Heterotrophic Plate Count: SOP 2.5
Results: **No Growth**
Liquid Volume: **1 (mL)**
MRL: **1**

Client Sample #: 2
Lab Sample #: 15034182-002
Sample Location: BASEMENT LAB SINK 1
Test: 2056, Water Heterotrophic Plate Count: SOP 2.5
Results: **No Growth**
Liquid Volume: **1 (mL)**
MRL: **1**

Aerobiology Laboratory Associates, Incorporated
Expertise Since 1997

Lab Use: 15034182

Page _____ of _____

ELITE CO, GA, VA

NVLAP
NVLAP Lab Code 200860-0 (CO)
NVLAP Lab Code 200829-0 (VA)
NVLAP Lab Code 500097-0 (AZ)

LAB #192683 (CO)
LAB #102977 (GA)
LAB #163063 (VA)
LAB #210229 (AZ)

Aerobiology Client	Clarity Water Technologies, LLC		
Field Contact	Greg Frazier	Collected By/Date: GF 12/24/15	Relinquished By/Date:
Address	50 North Harrison Avenue, Suite #10	Relinquished By/Date:	Received By/Date:
Address	Congers, NY 10920	Sampler Type: Andersen___ SAS___	SampleAire___ AeroTrap___ Other___ BioCulture___
Phone/Fax	888 616-3545	PO#/Job#/Project Name:	Bio Trial, Newark NJ
Email	gfrazier@claritywatertech.com		
Routine ◉	24 Hour ○ Same Day ○ 4 Hour ○ 2 Hour ○	5 Day (Asbestos Only)	Notes/CC Info:
Zip Code Where Work Is Performed			

	Sample No.	Test Code	Sample Location	Total Volume/Area
1	1	2056	3rd Floor Mens Toilet/Shower 1	
2	2	2056	Basement Lab Sink 1	
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				

1054	Direct, Non-viable Spore Trap	1015	Culture - WATER Legionella
1051	Direct, Qualitative- **Swab/Tape**	1017	Culture - SWAB Legionella
1050	Direct, Qualitative- **Bulk**	1010	WATER - Potable - E. coli/total coliforms
1005	AIR Culture - Bacterial Count w/ ID's	1012	SWAB - E. coli/total coliforms
1030	AIR Culture - Fungal Count w/ ID's	1028	Sewage Screen (E. coli/Enterococcus/fecal coliforms)
1006	SWAB Culture - Bacterial Count w/ ID's	2056	Heterotrophic Plate Count
1031	SWAB Culture - Fungal Count w/ ID's	3001	ASBESTOS - Point count
1008	BULK Culture - Bacterial Count w/ ID's	3002	ASBESTOS - PLM Analysis
1033	BULK Culture - Fungal Count w/ ID's	3003	ASBESTOS - Particle characterization
1007	WATER Culture - Bacterial Count w/ID's	3004	ASBESTOS - PCM Analysis

Send samples and this form to:
Pure Earth Environmental Lab
7184 N Park Drive
Pennsauken Township, NJ 08110
Ph. (856) 486-1177

Legionella samples MUST be sent for NEXT DAY DELIVERY.
This lab can ONLY accept samples Monday through Friday.

1/14 Revision 9

APPENDIX 2

clarity water technologies llc

50 North Harrison Avenue, Suite #10 • Congers, NY 10920 • Ph: 888 616-3545 • E-Mail: accounting@claritywatertech.com

January 23, 2016

Mr. Robert C. Butler
Jersey Mechanical Contractors, Inc.
5006 Industrial Road
Farmingdale, New Jersey 07727

Via E-mail: Rcbutler@jerseymechanicalcontractors.com

Re: Biotrial Domestic Water Quality Report

Dear Rob:

The purpose of this report is to summarize the corrective actions that have taken place with regards to the quality of the domestic water at the Newark, NJ location of BioTrial. This report will also contain recommendations by Clarity Water Technologies, LLC for Jersey Mechanical and BioTrial going forward.

December 29th, 2015 Sterilization and Initial Flushout:

On Tuesday, December 29, 2015, Clarity Water Technologies, LLC provided a team to chemically sanitize and flush the domestic water system at BioTrial – USA, 130 Norfolk Street, Newark, NJ 07103 from 8:00 am to 4:30 pm.

Two issues were detailed as concerning for the facility that prompted this project. The first was high heterotrophic plate counts (microbiological counts) returned from a recent test, and the second was a yellowish to brownish tint to the water, primarily on the 3rd floor, a floor that has had little to no occupancy, and the lab in the Basement.

The metallurgy of the domestic water system is entirely copper, with the exception of the main water supply to the feed water pumps in the basement, which is black pipe.

Before treatment, the domestic water had iron levels above 2.5-ppm in most locations. This would produce a yellowish tint visible to the naked eye. Since the system metallurgy is copper, this iron was suspected to be coming from the city water make-up. The city water supply directly from the inlet into the building had an iron level of 1.8-ppm and a free chlorine residual of 0.36-ppm. Both of these

levels are higher than usual for a typical make-up source, but not necessarily out of range. The individual fixtures, however, are where the higher iron levels were recorded.

Since the building was unoccupied during the week between Christmas and New Year's Day, Clarity Water Technologies, LLC injected a chlorine dioxide solution into the domestic water supply for the building. This was injected down-line of the back flow prevention device. A system pump was bumped manually to facilitate draw into the system, and all three water system were treated. These include the cold water system, the 110 ºF hot water (for the facility), and the 140 ºF hot water (exclusive to kitchen).

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During injection and circulation, all fixtures were opened and tested to obtain a chlorine dioxide level of at least 3-5 ppm. Once this was obtained at each fixture, the fixture was closed to allow for contact time.

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Iron and copper levels were also tested post procedure and returned levels of 0.1-ppm to 0.49-ppm, and 20-ppb to 32-ppb respectively. Water was analyzed visually as well, and all water samples returned a clear sample as evidenced in pictures.

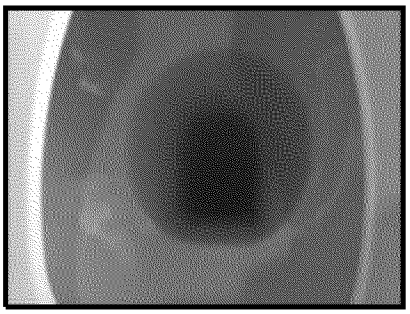
At the conclusion of this process, two samples were taken, one each from the primary areas of concern, the 3rd floor and the basement lab, and sent to a national lab for a heterotrophic plate count. The results are attached and both samples yielded counts of 0 cfu's/ml (colony forming units per milliliter).

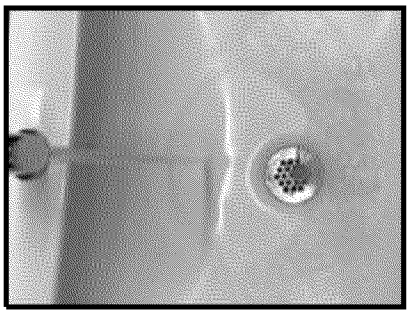
January 6th, 2016 Site Visit and January 11th System Flushout:

After the completion of the sterilization by Clarity and a few days upon the building being occupied (sparsely on the top floor), it was discovered that in some of the sinks and toilets the discolored (yellow/brownish tint) water had returned. BioTrial Personnel also noticed in some of the water fixtures on the 4th

floor a "milky" discharge as well. Clarity representation returned to survey the systems to determine possible reasons for this. Testing on loops on each floor revealed high iron content with the 3rd floor the most severe:

Location of 1/6/2016 Analysis	Iron Level (ppm)
4th Floor Women's RR Sink #2	0.53
3rd Floor Women's RR Sink #1	0.85
3rd Floor Men's Shower	3.31
2nd Floor Men's RR Sink	0.28
1st Floor Restroom Sink	0.31





This is the cause of the bubbly, frothy water that appears milky out of the tap was determined to be excessive air out of the system. Once this water settles and the gas comes out of solution, the bubbles and milky color are gone.

For the discolorated water it was decided that the best course of action was to conduct another round of flushouts on Monday, January 11th. Clarity brought a crew of 6 technicians to the site and conducted two separate flushouts (one on the morning and one around noon) on every water outlet in the building. On the second round of flushing the only outlet that appeared to have any yellow/brown discoloration was a nurse's sink located at the far end of the 3rd floor at the end of a branch. However the remaining systems all showed clear water clarity and minimal iron residual.

Location of 1/11/2016 Analysis	Iron Level (ppm)
4th Floor Women's RR Sink #2	<0.05
3rd Floor Women's RR Sink #1	<0.05
3rd Floor Men's Shower	0.06
2nd Floor Men's RR Sink	<0.05
1st Floor Restroom Sink	<0.05

Current Situation:

Since the flushout on January 11th, there have been reported occurrences of discolored water in certain sinks on the inhabited levels of the building. Usually

allowing the faucets or toilets to run for under a minute clears the water clarity entirely. The reason why this is occurring has not been conclusively proven however there could be several theories:

1. Low Flow/Limited Water Turnover in Building:

As we have discussed, this facility has had limited occupancy and limited use since it was completed in September of 2015. In addition, the City of Newark increased the hypochlorination of the city water at about the same time to proactively treat the water for water borne pathogens, especially legionella, in response to the issue that NYC was dealing with during the previous months. This increase of chlorine significantly increased the oxidation (corrosion) of the pipe in the feed water lines to the facility. These two factors coupled together created the two issues that have plagued this facility over the past several months, the discolored water and the high bacteria counts.

The treatment of CLO2 was selected to correct both of these issues. ClO2 is a highly effective disinfectant for all pathogens, and it is very effective in oxidizing iron and manganese - the two metals that were found in your domestic water. And has been documented, the bacteria issues in the domestic water at this building has been successfully eradicated.

As we have stated previously in conversations, this is an operational issue, not a chemical one. As long as the facility is underutilized, and the water system is not used, anything in the water pipe will come out through the faucets. The 3rd Floor has had no occupancy since the facility was opened in September, and the use of low flow, motion sensitive faucets has decreased the ability to remove impurities in the system at this local point effectively. The best course of action, other than having the facility occupied and in use, is to flush the system continuously at the point of issue, in this case the third floor bathroom, for a longer period of time. As we have seen with each successive flush, the clarity of water has improved, and the iron levels have lessened significantly.

It has been shown that other facilities in the area experienced iron and coloration issues after the city increased its chlorine levels, but both these issues subsided over time as the facilities turned over (i.e. used) the water. Until this facility is more fully occupied and operational, whatever settles in the domestic water system will come out through the faucets.

Ultimately we believe additional flushing at point of usage would solve the issue. We understand that the city has corrected the high iron level coming into the facility, and as we discussed, there is absolutely no black pipe (iron) in the system. The entire system is constructed of copper, the feed pumps are stainless steel, and there is no chance of cross contamination with the fire suppression system. There is no metal in the system that can or will produce iron. However, areas of low flow, air pockets, and restrictive faucets have

prevented the complete removal of this iron. If the city water still had iron present, it could be filtered and removed, but once the iron is in the system as it is here, it can only be flushed.

2. Incoming Contamination from City Pipelines Entering the Building:

As stated previously surrounding neighbors of BioTrial have experienced water quality issues from Newark pipelines. It goes without saying that the piping infrastructure in that area is older and with the constant construction/road work involved in the immediate area, there is a high possibility that "jostling" of the pipes could lead to upsets and surges of iron based particulate breaking off and entering the building. For the other buildings, due to the higher inhabitancy and water turnover, the issue is not as noticeable as it is for BioTrial. And unless there is a monitoring system that tracks these upsets, spot checking them manually will not give us accurate data. (While we may test for iron at 1:03PM and come back with nothing it does not mean the city sent a surge of it at 7:34AM and it is sitting in the pipes due to lack of turnover.)

Jersey Mechanical has been in contact with Precision Filtration Products who specialize in iron and other contaminant removal through filtration equipment that hooks up to the incoming makeup lines. Due to the critical nature of the work at this location, having an incoming filter to capture any impurities that the city may accidentally release would be a sound idea.

Options Going Forward:

Clarity Water Technologies, LLC was initially brought into this situation due to the biological contamination with the domestic water piping. We were successful in eradicating this issue however the discolored water due to iron and manganese remain. As stated before, this is an operational issues more than a chemical issue and feel a combination of larger water turnover plus some filtration on the incoming lines will prevent this from reoccurring.

However in the event that time is of the essence and to attempt to speed up this remediation, Clarity can offer a possible solution as follows:

Clarity has a product called CL-99 that is an iron dispersant specifically designed for potable water. We can inject it over a period of 4 days with heavy flushing at the end of each day. It will aide in transporting any residual iron in the building that may be attached to the walls of the copper or stainless piping out through the drains. Clarity will send a team of 3-4 technicians every day to inject, oversee, test and flush the system thoroughly. However, no one in the building can use the water systems during this period and Clarity cannot guarantee its success if there is any active corrosion that is unnoticed in the system or if any iron comes into the loop from the city after the process.

The cost for this project would be $9,750.00.

Clarity can also offer the option of doing a complete battery of tests on selected water systems to see if there is any other reason for the contamination other than iron, copper or manganese that may be impacting the clarity. Clarity will come, sample and ship the water containers to our laboratory in Ohio and will have the results back within a week. **The cost for this would be $405.00 per sample**.

Jersey Mechanical has suggested possibly taking a piece of piping from the building for us to examine to see if any possible corrosion is local or generalized. The cost for Clarity to run this examination would be $300.00

Lastly, getting the Tiger Pumps serviced to examine the airbound issues they have on the upper floors as well as possibly investigating if there may be a corrosion cell internally causing the iron contamination would be beneficial as well.

Should you have any questions about what we have recommended, please do not hesitate to contact us at any time.

Best Regards,

Greg Frazier
Managing Director

Christopher Scala
Regional Manager

APPENDIX 3

CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Date of Report: 03/15/16
Lab ID: 16-0009729
Date Collected: 03/03/16 08:00
Collected By: Client
Date Received: 03/08/16 15:00

Attention: John Ficke
1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

_D_R_A_F_T___R_E_P_O_R_T_

Sample Desc: #1 B10T0001

	Conc.	Unit	Test Date	Procedure
INORGANIC				
TOTAL				
Iron, Total	<.02	mg/l	03/11	EPA 200.7
Lead, Total			?	epa 200.8

NOTE: THIS IS A DRAFT REPORT

Reviewed and Approved By:

Barbara Coyle
Laboratory Director

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
PHONE: 610-374-5129 • FAX: 610-374-7234 • **www.mjreider.com**

CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Sample Desc: #2 B10T0001

Date of Report: 03/15/16
Lab ID: 1990-16-0009730

Date Collected: 03/03/16 08:51
Collected By: CLIENT

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	0.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

Reviewed and Approved by:

for
Bradley Griffiths
Account Executive & Marketing

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
PHONE: 610-374-5129 • FAX: 610-374-7234 • **www.mjreider.com**

CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Date of Report: 03/15/16
Lab ID: 1990-16-0009731

Date Collected: 03/03/16 09:15
Collected By: CLIENT

Sample Desc: #3 B10T0001

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

Reviewed and Approved by:

for
Bradley Griffiths
Account Executive & Marketing

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
PHONE: 610-374-5129 • FAX: 610-374-7234 • **www.mjreider.com**

CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Sample Desc: #4 B10T0001

Date of Report: 03/15/16
Lab ID: 1990-16-0009732

Date Collected: 03/03/16 09:57
Collected By: CLIENT

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

Reviewed and Approved by:

for
Bradley Griffiths
Account Executive & Marketing

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
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CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Sample Desc: #5 B10T0001

Date of Report: 03/15/16
Lab ID: 1990-16-0009733

Date Collected: 03/03/16 10:30
Collected By: CLIENT

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

Reviewed and Approved by:

Bradley Griffiths
Account Executive & Marketing

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CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Date of Report: 03/15/16
Lab ID: 1990-16-0009734
Date Collected: 03/03/16 11:06
Collected By: CLIENT

Sample Desc: #6 B10T0001

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

Reviewed and Approved by:

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Account Executive & Marketing

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M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Date of Report: 03/15/16
Lab ID: 1990-16-0009735

Date Collected: 03/03/16 11:37
Collected By: CLIENT

Sample Desc: #7 B10T0001

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

Reviewed and Approved by:

for

Bradley Griffiths
Account Executive & Marketing

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CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Date of Report: 03/15/16
Lab ID: 1990-16-0009736

Date Collected: 03/03/16 12:10
Collected By: CLIENT

Sample Desc: #8 B10T0001

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	0.29	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

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Bradley Griffiths
Account Executive & Marketing

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M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Sample Desc: #9 B10T0001

Date of Report: 03/15/16
Lab ID: 1990-16-0009737

Date Collected: 03/03/16 12:42
Collected By: CLIENT

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

Reviewed and Approved by:

for

Bradley Griffiths
Account Executive & Marketing

THE NELAC INSTITUTE

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CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Date of Report: 03/15/16
Lab ID: 16-0009738
Date Collected: 03/03/16 13:20
Collected By: Client
Date Received: 03/08/16 15:00

Attention: John Ficke
1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

_D_R_A_F_T___R_E_P_O_R_T_

Sample Desc: #10 B10T0001

	Conc.	Unit	Test Date	Procedure
INORGANIC				
TOTAL				
Iron, Total	<.02	mg/l	03/11	EPA 200.7
Lead, Total			?	epa 200.8

NOTE: THIS IS A DRAFT REPORT

Reviewed and Approved By:

Barbara Coyle
Laboratory Director

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
PHONE: 610-374-5129 • FAX: 610-374-7234 • **www.mjreider.com**

CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Sample Desc: #11 B10T0001

Date of Report: 03/15/16
Lab ID: 1990-16-0009739

Date Collected: 03/03/16 13:59
Collected By: CLIENT

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

Reviewed and Approved by:

for

Bradley Griffiths
Account Executive & Marketing

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M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Sample Desc: #12 B10T0001

Date of Report: 03/15/16
Lab ID: 1990-16-0009740

Date Collected: 03/03/16 14:32
Collected By: CLIENT

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

Reviewed and Approved by:

for

Bradley Griffiths
Account Executive & Marketing

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M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Date of Report: 03/15/16
Lab ID: 1990-16-0009741

Date Collected: 03/03/16 15:10
Collected By: CLIENT

Sample Desc: #13 B10T0001

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

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Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Sample Desc: #14 B10T0001

Date of Report: 03/15/16
Lab ID: 1990-16-0009742

Date Collected: 03/03/16 15:40
Collected By: CLIENT

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

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for

Bradley Griffiths
Account Executive & Marketing

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M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Sample Desc: #15 B10T0001

Date of Report: 03/15/16
Lab ID: 1990-16-0009743

Date Collected: 03/03/16 16:14
Collected By: CLIENT

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

Reviewed and Approved by:

for

Bradley Griffiths
Account Executive & Marketing

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M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Sample Desc: #16 B10T0001

Date of Report: 03/15/16
Lab ID: 1990-16-0009744

Date Collected: 03/03/16 16:44
Collected By: CLIENT

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

Reviewed and Approved by:

for Bradley Griffiths
Account Executive & Marketing

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M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Sample Desc: #17 B10T0001

Date of Report: 03/15/16
Lab ID: 1990-16-0009745

Date Collected: 03/03/16 17:14
Collected By: CLIENT

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

Reviewed and Approved by:

for Bradley Griffiths
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CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: John Ficke
Reported To: 1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341

Sample Desc: #18 B10T0001

Date of Report: 03/15/16
Lab ID: 1990-16-0009746

Date Collected: 03/03/16 17:44
Collected By: CLIENT

Date Received: 03/08/16 15:00

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
INORGANIC								
TOTAL								
Iron, Total	<.02	mg/l	.02	1	EPA 200.7	03/11	10:53	HRG

Distribution of Reports:

Reviewed and Approved by:

for Bradley Griffiths
Account Executive & Marketing

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CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Date of Report: 03/15/16
Lab ID: 16-0009747
Date Collected: 03/03/16 18:14
Collected By: Client
Date Received: 03/08/16 15:00

_D_R_A_F_T___R_E_P_O_R_T_

Attention: John Ficke
1 Source Safety and Health, Inc.
140 South Village Avenue
Suite 130
Exton PA 19341
Sample Desc: #19 B10T0001

	Conc.	Unit	Test Date	Procedure
INORGANIC				
TOTAL				
Iron, Total	<.02	mg/l	03/11	EPA 200.7
Lead, Total			?	epa 200.8

NOTE: THIS IS A DRAFT REPORT

Reviewed and Approved By:

Barbara Coyle
Laboratory Director

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
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CHAIN OF CUSTODY RECORD

M. J. Reider Associates, Inc.
107 Angelica Street, Reading PA 19611
Phone: 610-374-5129 Fax: 610-374-7234
www.mjreider.com

(1)

ALL SAMPLES MUST BE DELIVERED ON ICE

*Please see instructions and Terms and Conditions on back side of form.

Page __ of __

Turnaround Time
X Standard
RUSH (*additional fees may apply)
Need RUSH Results By: / /

Client (Report): Source Safety and Health
Contact: Chris Schneider
Address: 140 S. Village Ave, Suite 120, Exton, PA 19341
Email: CSCHNEIDER@SSH.COM
Phone: 610.524.5525

Client (Invoice, if different from above): Acct. 1990
Contact:
Address:
Email:
Phone:

Composite Info	Sample Receipt	Matrix Codes	Container Codes		Preservative Codes		PO #: B10T0001
Start __/__/__ @ __	Temp @ Receipt: 4 °C	WW = Waste Water	**Size**	**Type**	C = HCL	T= Na2S2O3	
Stop __/__/__ @ __	Samples received on ice? (Y) N	DW = Drinking Water	L = Liter	P = Plastic	N = HNO3	E = EDTA	PWSID #:
Composite Info	Approved By: LXS	GW = Ground Water	500 = 500mL	G = Glass	S = H2SO4	L = NH4CL	
Start __/__/__ @ __	Method of Shipment:	ST = Storm Water	250 = 250mL	V = VOA Vial	P = H3PO4	Z = Zinc Acetate	Field Data:
Stop __/__/__ @ __	Tr #:	S = Soil/Solid	120 = 120mL	S = Sterile	H = NaOH	A = Asc. Acid	
	Cooler return fee: $	O = Other	40 = 40mL	O = Other	O = Other:		

Sample Collected By: Chris Schneider

Container Size (use codes listed above): ~~250~~ 500mL (initialed 030916)
Container Type (use codes listed above): P
Preservative (use codes listed above): N

MJRA ID	Sample Description (Location Name)	Date	Time	Matrix	Grab	Composite	Bottle Count	Size	Type	Preservative	Analyses Requested	
9729	#1	3/3/16	8:00AM	DW	Y			250	P	N	Total Iron	Pb
9730	#2	3/3/16	8:37AM	DW	Y			250	P	N	" "	
9731	#3	3/3/16	9:15AM	DW	Y			250	P	N	" "	
9732	#4	3/3/16	9:57AM	DW	Y			250	P	N	" "	
9733	#5	3/3/16	10:30AM	DW	Y			250	P	N	" "	
9734	#6	3/3/16	11:06AM	DW	Y			250	P	N	" "	
9735	#7	3/3/16	11:37AM	DW	Y			250	P	N	" "	
9736	#8	3/3/16	12:10PM	DW	Y			250	P	N	" "	
9737	#9	3/3/16	12:42PM	DW	Y			250	P	N	" "	
9738	#10	3/3/16	13:20	DW	Y			250	P	N	" "	Pb

Comments: Lead added to samples #1, #10, & #19 (initialed 030916) as per Chris S. 3/14/16 (LXS 3/18/16)

Relinquished By:	Date: 3/8/16	Time: 8:25am	Received By:	Date: 3/9/16	Time: 1055	Entered By:	PM: BTG
Relinquished By:	Date:	Time:	Received @ Laboratory By:	Date: 3/8/16	Time: 1500		

The Client, by signing (or having the client's agent sign) this Chain of Custody Form agrees to MJRA's Terms and Conditions and to pay for the above requested services including any and all attorney fees if collection becomes necessary.

CHAIN OF CUST(

M. J. Reider Ass(
107 Angelica Street, R
Phone: 610-374-5129
www.mjreic

Client (Report): Source Safety and Health
Contact: Chris Schroeder

Client (Invoice, if different from above):
Contact: Act. 1990

_____ Composite Info	Sample
Start ___/___/_____ @ _____	Temp @ Receipt: _
Stop ___/___/_____ @ _____	Samples received o
_____ Composite Info	Approved By:
Start ___/___/_____ @ _____	Method of Shipmer
Stop ___/___/_____ @ _____	Tr #: _____
	Cooler return fee: $

Sample Collected By:

MJRA ID	Sample Description (Location Na
9739	#11
9740	#12
9741	#13
9742	#14
9743	#15
9744	#16
9745	#17
9746	#18
9747	#19
9748	030916 #20

Comments:

Relinquished By:

Relinquished By:

The Client, by signing (or having the client's agent sign) this Chain of Custody

APPENDIX 4

Biotrial

130 Norfolk Street
Newark, NJ 07103

Water System Consulting

1Source Project No. BIOT0001

May 18, 2016

1Source Safety and Health, Inc. (1Source) is pleased to provide this report regarding water quality issues at the Biotrial facility located at 130 Norfolk Street, Newark, NJ. The following report summarizes our activities, findings and conclusions.

1Source was retained by Biotrial to assist with identifying the source/cause of the "yellow/brown" water discoloration as first noticed in white bathroom fixtures in July 2015. In addition to Biotrial, 1Source collaborated with Natoli Construction Corporation and Jersey Mechanical Contractors. 1Source was also provided reports from Clarity Water Technologies, Inc. (Clarity).

Initially, the discoloration was thought to be due to lack of flushing by construction workers at the site. However, it was realized that this was not the case. During October 2015, Biotrial began occupying the building and the water quality had not improved. On October 26, 2015, Jersey Mechanical collected water samples and submitted them to Garden State Laboratory for biological analysis. No iron analysis was performed. The Garden State Laboratory report identified heterotrophic bacteria well in excess of the maximum contaminant level (MCL).

The City of Newark (The City) was contacted and on November 18, 2015 they were onsite to discuss the issue. The City decided to flush the fire hydrant(s) and recommended that Biotrial do a full system flush which was done on November 19/20, 2015. On November 23, 2015, the City and New Jersey Mechanical collected water samples for a limited analysis which DID NOT include iron. This is puzzling as bacteria DO NOT discolor water and the "yellow/brown" odorless discolored water is a clear indication of iron which the City water department should have known and should have analyzed the sample for both total and soluble iron.

The water quality issue continued and Clarity was retained to assist. On December 29, 2015, the domestic water system at Biotrial was "chemically sanitized and flushed". Clarity collected samples for iron analysis and the results where "above 2.5 ppm in most locations" which is well above the MCL of 0.3 ppm for iron and will cause discoloration of the water. **Clarity documented that iron was the cause of the water discoloration.** The treatment was effective in sanitizing the domestic water system but had no effect on the discoloration caused by the iron.

On January 11, 2016, Clarity conducted entire system flushes in the morning and afternoon because the discoloration was continuing. Clarity offered two causes for the discoloration. The first was "low flow/limited water turnover" in the building allowing the iron to precipitate out of solution, which is not possible based on water chemistry. The second was that the incoming City water from the main was the source; however, Clarity notes in their report that it is more an operational issue than a chemical issue and that with increased water use and some filtration the problem would resolve itself.

It is important to note that with exception of the stainless steel booster pumps, the entire water distribution system is copper. As such, there is no source for iron contamination. Additionally, the fire suppression for the building is a totally separate system beginning with a separate tap into the City water main.

1Source was contacted on January 27, 2016 and conducted a site visit on February 2, 2016 during which time we met with representatives from Biotrial, Natoli and Jersey Mechanical. During the site visit, we reviewed plumbing drawings and discussed the new service line "hot taps", termination of taps and old service lines from previously demolished buildings at the site, possible sources/causes and activities to date to resolve the issue. We also toured the facility and observed discolored water on all floors.

Based on the February 2nd meeting, it was agreed that the path forward needed to definitively exclude the building's plumbing system as the source and also needed to confirm that the City was providing unacceptable water that was causing the discoloration. To address these goals, the following three (3) tasks were implemented:

1. Install a particulate filter at the sampling port located on the backflow preventer to identify if iron is in the incoming City water.
2. Collect water samples after the filter to determine if there is soluble iron
3. Cut out sections of copper piping within the domestic water distribution system to evaluate possible iron deposition.

Task 1

1Source conducted research to identify an appropriate particulate filter for the experiment. A white material filter was selected so we could see the particulate loading. The filter selected was an Aqua-Pure 5 micron particulate filter which was installed (Photo 1) by Jersey Mechanical on February 26th and removed on Mach 3rd. According to Owen Nurse, the water flowing through the filter was described as a continuous "trickle" during the 7 days it was connected. The filter was sent to 1Source for evaluation. Please see Photo 2 which shows the large amount of particulate material that was filtered out of the incoming water. Composite samples of the filter media with the filtered particulate were collected and submitted for iron analysis which identified the concentration of iron at 2,320 mg/kg. Basically, the brown particulate material is primarily insoluble iron. This clearly points to the City water supply as the source of the iron contamination, and definitively excludes the building water distribution system as the source.

The filter was also submitted for lead analysis. Since the particulate material was embedded in the filter media, the laboratory analyzed the filter and particulate as one sample. The analytical result showed a lead concentration of 3 mg/kg. If the particulate material could be effectively separated from the filter, the lead concentration would be significantly higher. Lead in this

sample is tied up in the particulate material as is the iron. This further demonstrates that the lead and iron are of historical origin in sedimentation and corrosion.

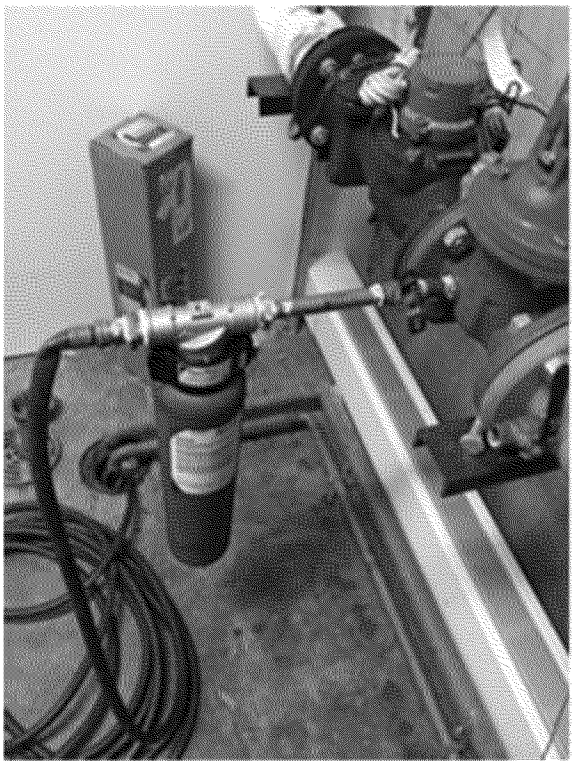

PHOTO 1 shows filter installation

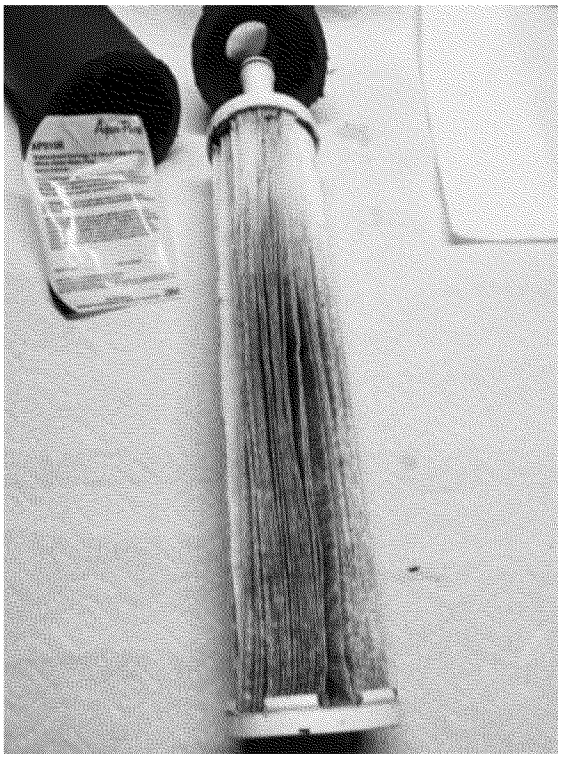

PHOTO 2 shows heavy particulate loading on filter

Task 2

On March 3rd, samples of filtered water were collected post particulate filter. One sample of water was collected every 30 minutes over a 9 hour period for a total of 19 water samples. The results of the soluble iron ranged from less than 0.02 to 0.02 mg/l for 18 of the 19 samples and 0.29 mg/l for one sample. Under EPA's secondary drinking water standards the maximum concentration limit (MCL) for iron is 0.3 mg/l, which includes both soluble and insoluble iron. Based on these low levels of soluble iron, it is apparent that the iron in the water is in the form of insoluble particulates which were captured on the filter. This accounts for the discoloration of the water. Three of the filtered water samples were selected for lead analysis and no lead was identified in the filtered water.

Task 3

On March 18th, sections of piping on the 3rd floor and basement were cut and removed to evaluate the level of particulate deposition on the interior of the piping. The following observations were noted:

1. 2" pipe from 3rd Floor by Men's Room - pipe was cut with a pipe cutter. No biological slime layer identified on vertical or horizontal portion of cut-out elbow pipe interior. Wipe test showed iron particulate residue on interior of horizontal section (Photo 3). Vertical section wipe was a slight gray color. Indicates that iron particulates settle out in the water.
2. 3" pipe from basement - pipe was cut with a reciprocating saw. Discolored yellow/brown water dripped from the pipe as it was being cut. No biological slime layer was identified on the pipe interior. Residue deposition is clearly seen in the pipe and on wipe (Photo 4).

PHOTO 3 Particulate residue on wipe from pipe interior

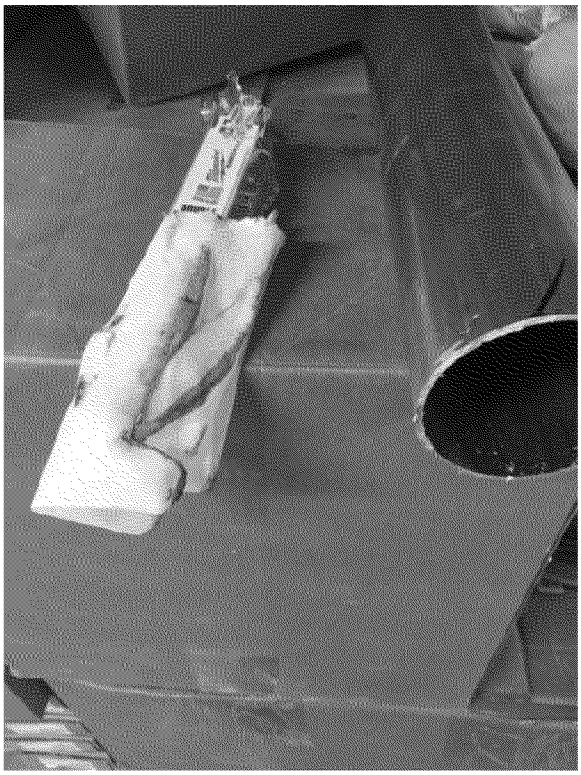

PHOTO 4 Particulate residue on wipe from pipe interior

The results of the three tasks definitively excluded the building's water distribution system as the source/cause and confirmed that the incoming water supplied by the City is unacceptable and is the source of the water discoloration caused by iron particulates. Despite these findings, the City was not accepting of the information and results. They theorized that the service line from the main shut-off valve to the building is potentially corroding, or there is a leak and the iron particulates are being drawn into the service line because the booster pumps cause the service line to be under a negative pressure. Both these proposed theories of sources for the iron particulates do not "hold water" *(pardon the expression)* because (1) the service line water pipes are ductile iron cement lined which is designed to prevent corrosion, i.e. rust. This type of piping is required by the City as per Section 331100 – Water Utility Distribution Piping specifications

Part 2.01, B, 1; and (2) the service water line is surrounded with aggregate rock so the pipe is not in contact with any soil so iron could not be drawn into the pipe (Photo 5). Additionally, a hydrostatic pressure test was conducted on the service water line after backfilling as required by the City as per Section 331100 – Water Utility Distribution Piping specifications Part 1.05, C.

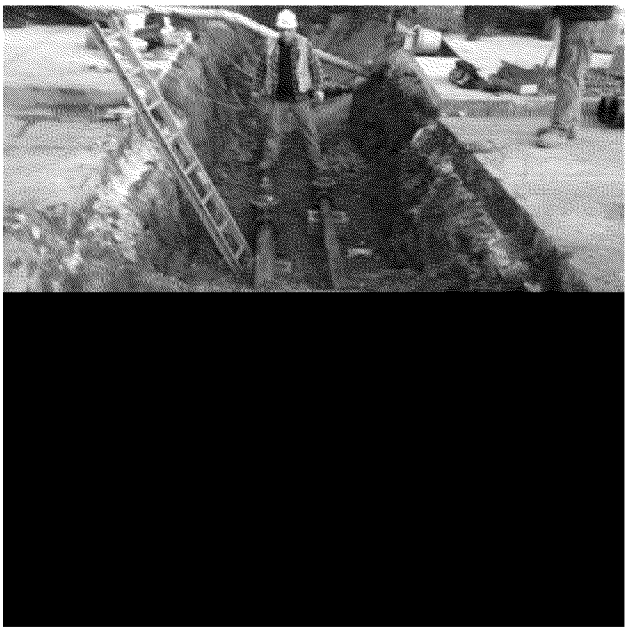

PHOTO 5 – Aggregate rock backfill around piping

On April 4th, the City visited the building and met with Biotrial and conducted several inspections including removing the water meter. When the meter was removed, it was observed by Biotrial that there was about 1 -2 cm of brown sediment on the bottom of the water meter housing. The presence of this sediment further confirms that the building water distribution system is not the source of the iron, which parallels the results of the water filtration test.

Apparently still not convinced that the City water main is the source because the fire hydrant flushes appeared clear, the City requested that Biotrial conduct a camera inspection of the service line running from inside the building out to the shut-off valve outside the building. The camera inspection was conducted on April 27th. The video inspection company stated in their report that "From elbow, sediment observed steadily increasing as camera continued towards valve. No pipe cracks, bellies, and/or damage detected". My review of the video clearly shows that sediment deposition on the interior of the pipe increases the closer the camera gets to the outside shut-off valve. The sediment deposition is evenly distributed on the pipe interior which says the source of the particulate iron is from a source beyond the shut-off valve, i.e., the City main. There is no evidence of a crack/void in the pipe where soil is being drawn into the service line. This video is

further evidence that the source of the particulate iron is located within the City's water distribution system.

Recently, it was identified by Biotrial that engineering drawings of Norfolk Street show a 20" water main and an 8" water main. The City has never mentioned that there was an 8" line which services all the homes and businesses in front of the Biotrial buildings on Norfolk Street as well as the surrounding blocks; and possibly three of the four fire hydrants based on the drawings are connected to the 8" water main. This explains why none of the residents or businesses in the area when queried had any complaints about discolored water as the 8" line is newer than the 20" line thereby having less sediment and tuberculation, if any. The engineering drawing also shows that termination of taps and old service lines from previously demolished buildings at the site on Norfolk Street were all terminated on the 20" line.

What could cause the release of iron particulate within the City main and allow it to be transported into the service water line for Biotrial?

In conversation with water system experts and water system chemists, the likely cause is due to the addition of the 2 new taps for Biotrial and the termination of water lines and old taps for 20 previously demolished buildings on Newark, New and Norfolk Streets. The termination of the 20 old taps was required by the City and performed by Rock Solid a contractor approved by the City to perform these services. Termination of the 20 old taps was required by the City prior to Biotrial tapping into the 20" water main. These types of changes to old piping (circa 1869) change water flow characteristics and disturb sediment that is lodged within the tuberculated surfaces of the piping. These tuberculated surfaces were penetrated when:

- sections of the main were cut out to remove the terminated 4 inch service lines
- two new hot-taps were installed for the domestic water and fire suppression systems for the Biotrial building.

The conclusion based on the supporting information Biotrial has compiled is that at some point on the City side of the outdoor shut-off valve, i.e. the 20" water main, iron rich particulates are being released from reservoirs of accumulated particulates and are being entrained into the water flow that supplies the Biotrial building.

Please contact 1Source with any questions or concerns regarding the contents of this summary report.